MINING PLAN

MINOR MINERAL LEASE
FOR STONE , SAND & BAJRI,
SITUATED IN KHASRA No.2721/1,
4.1207 HECTARES,
MAUZA PRAIN,
TEHSIL JOGINDERNAGER,
DISTRICT MANDI, HIMACHAL PRADESH

LETTER OF INTENT ISSUED IN FAVOUR OF
THE GENERAL MANAGER
TRIVENI MAHADEV & THANA PLAUN HEP'S,
HIMACHAL PRADESH POWER CORP. LTD.,
TEHSIL KOTLI, DISTT. MANDI.
HIMACHAL PRADESH.

Jhumpa C. Jamwal
HP/RQP/21/1/2016.

2023

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MAP INDEX

Declaration
Certificate of RQP

भूवैज्ञानिक शाखा,
उद्योग विभाग शिमला
Geological wing
Dept. of Industries
Shimla
APPROVED
With Conditions
शर्तों के साथ स्वीकृत
Advice Letter No. Udyog-Bhu (Ichami-4) Laghu-538/17-1621
Dated,
Dated 23/5/23

Geologist Grade-I
Geological Wing
Deptt. of Industries Shimla-1

GM/AGM/DM (Env)
29/05/

MINING PLAN
OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA No. 2721/1, MEASURING 4-1207 HECTARE MAUZA PRAIN, TEHSIL –JOGINDERNAGER, DISTT – MANDI (H.P.)
LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPs, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

INTRODUCTION:

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' for grant of mining lease for mining sand, stone and bajri for a period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-538/2017-11940 dated 06/03/2019 and extended for further period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-538/2017-6730 dated 9/11/2021 .

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely Pabber Valley Power Corporation (PVPC) and Kinner Kailash Power Corporation (KKPC), earlier owned by HPSEB, have been merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31.07.2007.

Thana plaun Hydro Electric Project is located between latitude 76° 15'E to 77° 45'E and longitude 31° 30'N to 32° 30' N in district Mandi. The project has been planned as a runoff river dam storage scheme on the right bank of river Beas with its Dam across the river Beas and underground Powerhouse located on right bank Of the river near village Thana. The Stone, Bajri and sand quarried from lease area will be used in the construction of the Project and its infrastructure.

In accordance with Rule 35 of the 'Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015' the lessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the said Rules

The quarry lease area is located at about 36 Km. from Jogindernager. The area can be approached through a rural road branching from SH 19.

General:

1.1 Name and address of the applicant

1.1. A. Name of the applicant --
The General Manager

1.1. B. Address of the applicant –
The General Manager
Triveni Mahadev & Thana Plaun HEP's,
Himachal Pradesh Power Corporation Ltd.,
Tehsil Kotli, Distt. Mandi.

1.2 Status of the applicant
Government undertaking.

1.3 Minerals which the Applicant intends to mine

The applicants intend to mine stone, Sand and Bajri. The stones, sand and bajri will be used in construction activities of the Projects.

1.4 Period for which the mining lease is granted

Five years effective from the date of execution of lease deed agreement.

1.5 Name and address of the RQP preparing the Mining Plan:
Jhumpa C. Jamwal
Cottage No. 21, Type IV, HP Government Officers Residences,
CPWD Colony, Bemloe, Himachal Pradesh
RQP Registration No. HP/RQP/21/1/2016
Mobile No. 9418909890.

1.6. Name and address of the prospecting agency
The base contour map of the leased area was prepared by Shri C.P.Negi, Retired Senior Surveyor, Geological Wing, Department of Industries, resident of Negi Lodge (West), Indernager, Dalli Shimla for the RQP.

The detailed prospecting of the area was carried out by the R Q P for preparation of this report. The Secondary data is collected from various Geological reports of the Geological Survey of India, Satluj Jal Vidyut Nigam Ltd., Indian Metrological Department, Department of Economic and Statistics, Himachal Pradesh, and various publications of Government of Himachal Pradesh. The detailed prospecting of the area was carried out by the R Q P for preparation of this report.

2. Location and Approach of the area

2.1 Topo-sheet Details.

Surveyed by	Survey of India
Surveyed in	1989-90, upgraded 2005
Sheet No.	H43E13
Scale	1:50,000
Edition	First

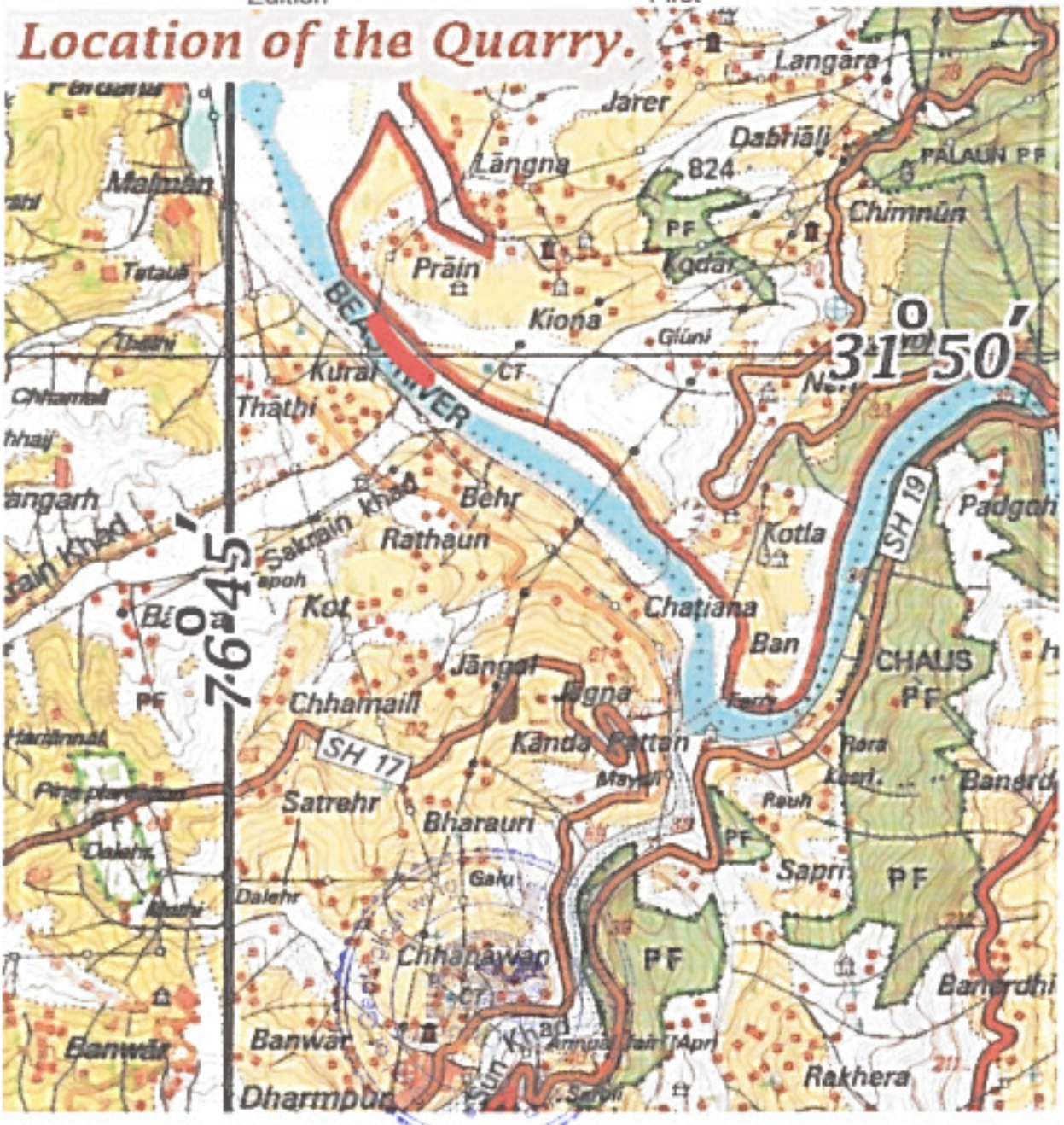

Figure 1: Location of the Mining Lease area.

The area lies between the latitude and longitude given below in table 1 and shown in the Figure 2.

Table 1Showing latitude and longitude of the area (Calculated)

Pillar	Latitude	Longitude
A	31° 50' 11.58"	76° 45' 20.30"
B	31° 50' 08.24"	76° 45' 25.04"
C	31° 50' 00.77"	76° 45' 30.10"
D	31° 49' 58.31"	76° 45' 34.61"
E	31° 49' 56.18"	76° 45' 33.57"
F	31° 49' 58.96"	76° 45' 28.27"
G	31° 50' 06.82"	76° 45' 22.62"
H	31° 50' 1026"	76° 45' 18.08"

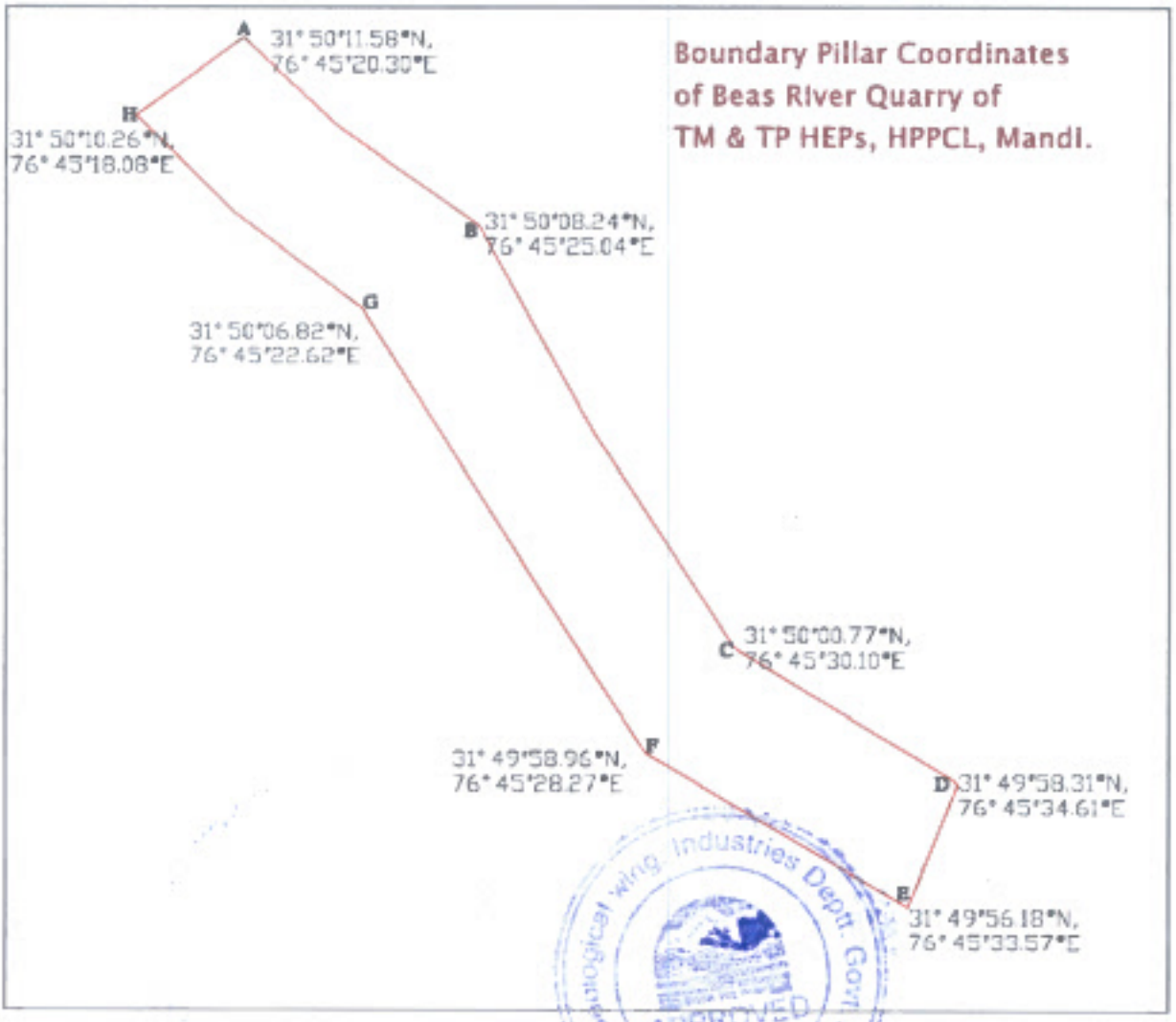

Figure 2: Calculated Coordinates of Boundary Pillars

2.2 Location of area of lease

2.2a Details of area

The Revenue details of the area are given below in table 2

Table 2:The detail of the lease area

Khasra Number	Area Hectares	Owner of Land	Kism	Mauza/mohal
2721/1	4.1207	Government	Gair mumkin Darya	Prain
TOTAL			4.1207 HECTARES	

2.3 Address & Detail of Lease

	Village: -	Prain
	Patwar circle:	Langna
	Post Office: -	Langna
	Tahsil: -	Jogindernager
	District: -	Mandi
Administrative Office	Sub-Divisional Office (Civil): -	Jogindernager
	Divisional Office (Forest): -	Jogindernager
	Range Office (Forest): -	Joglndenager
	Assistant Engineer (IPH): -	Langna
	Assistant Engineer (PWD): -	Langna
	State :	Himachal Pradesh

2.4 Distance from Important Places to Quarry site.

Distances from the Quarry site			
S. No.	From	To	Distance (in K.mt.)
1	Quarry	Roadside NH 3	0.10
2	Roadside	Joginder Nager	36
3		Mandi (District Offices)	74
4		Shimla (State Hq)	171
5		Dharmsala	92
		Gaggal (Airport)	96
6		Dharampur	23
7		Sarkaghat	36
8		Sujanpur Tira	64

2.5 Approach to the Area.

The leased site is part of Riverbed and is at 0.1 km from Rural Road leading to SH 19. Joginder Nager via SH 19 is 36 kms from the quarry site. The SH 19 connects to NH 3 near Dharampur leading to Mandi at 74 Km from Quarry site.

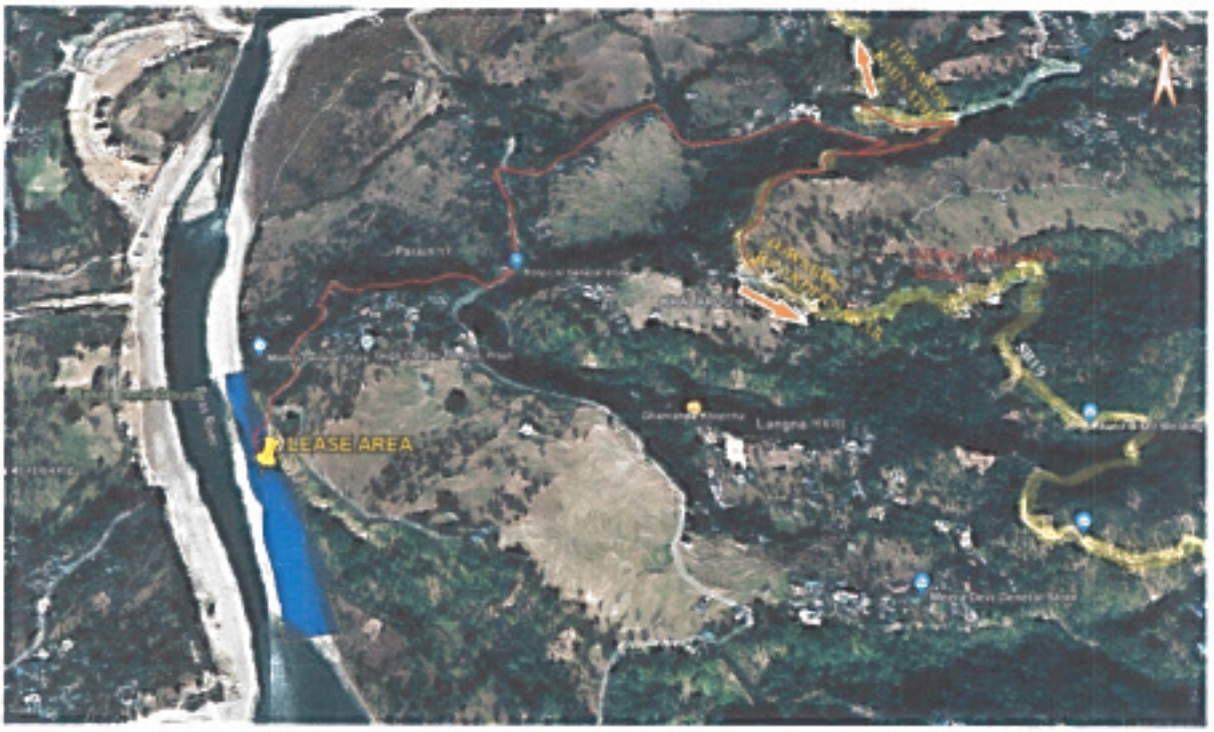

Figure 3: ***Approach to Quarry site***

3. Physiographical Aspect of the Area

3. 1 General

The area in general is a part of the Lesser Himalaya. The Lesser Himalayas, located in north-western India in the states of Himachal Pradesh and Uttar Pradesh, in north-central India in the state of Sikkim, and in north-eastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height.

The general relief of the Mandi District is as given below in the figure: -3: -

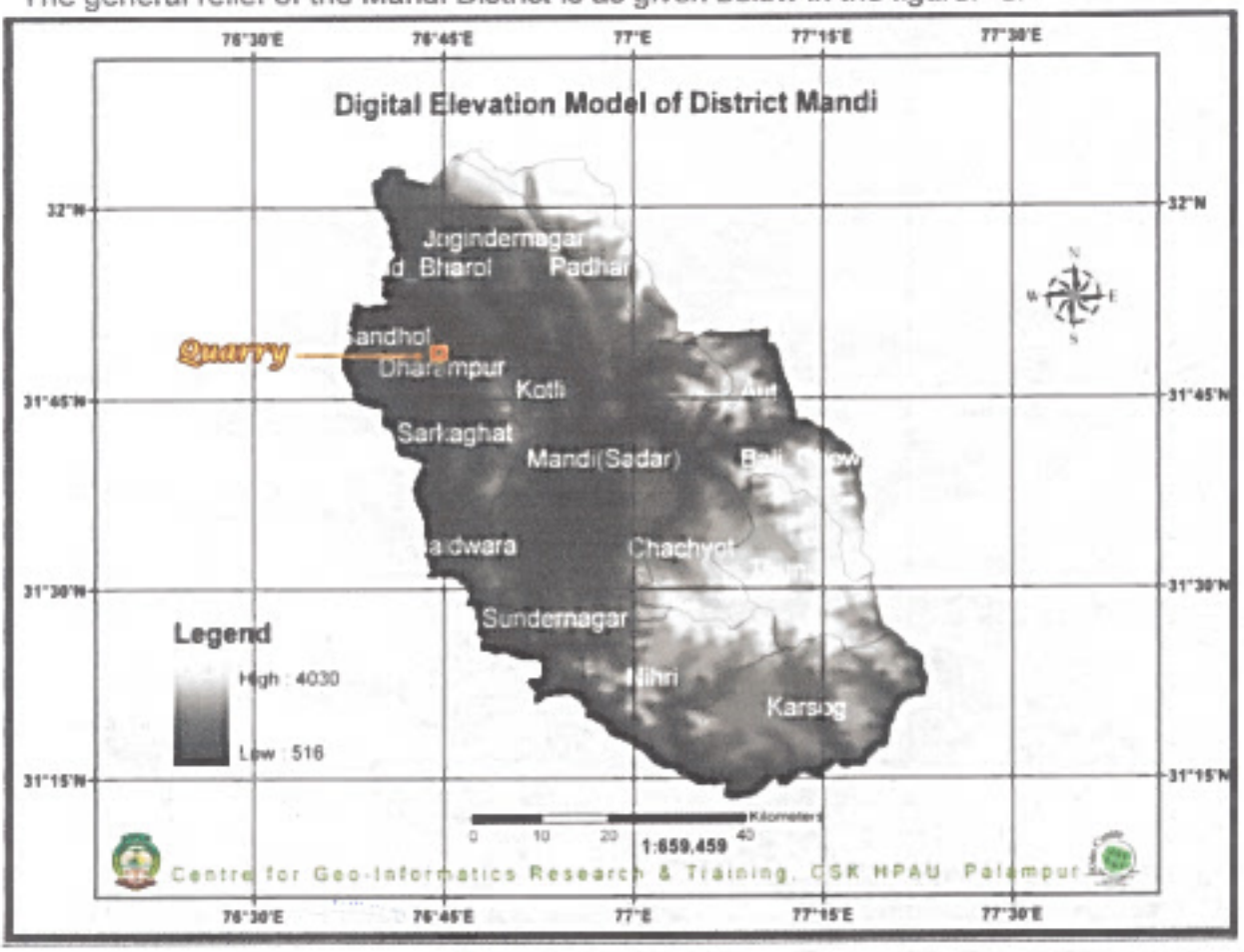

Figure 4: The Digital elevation map of the Mandi district.

The Satellite photograph was taken from the Google is given below (Figure: -4) to depict the general physiography of the area showing that the major ridges/water divides are generally running N-S and all spurs are running parallel to the NE-SW line.

3.2 Altitude of the area

- The highest contour of leased out area in Beas River is 609 Meters above MSL,
- The lowest contour of the leased-out area in Beas River is 605 Meters above MSL,

Figure 5: Terrain Map of the Area.

3.3 Climate of Area

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and

month wise temperature is given in figure 7.

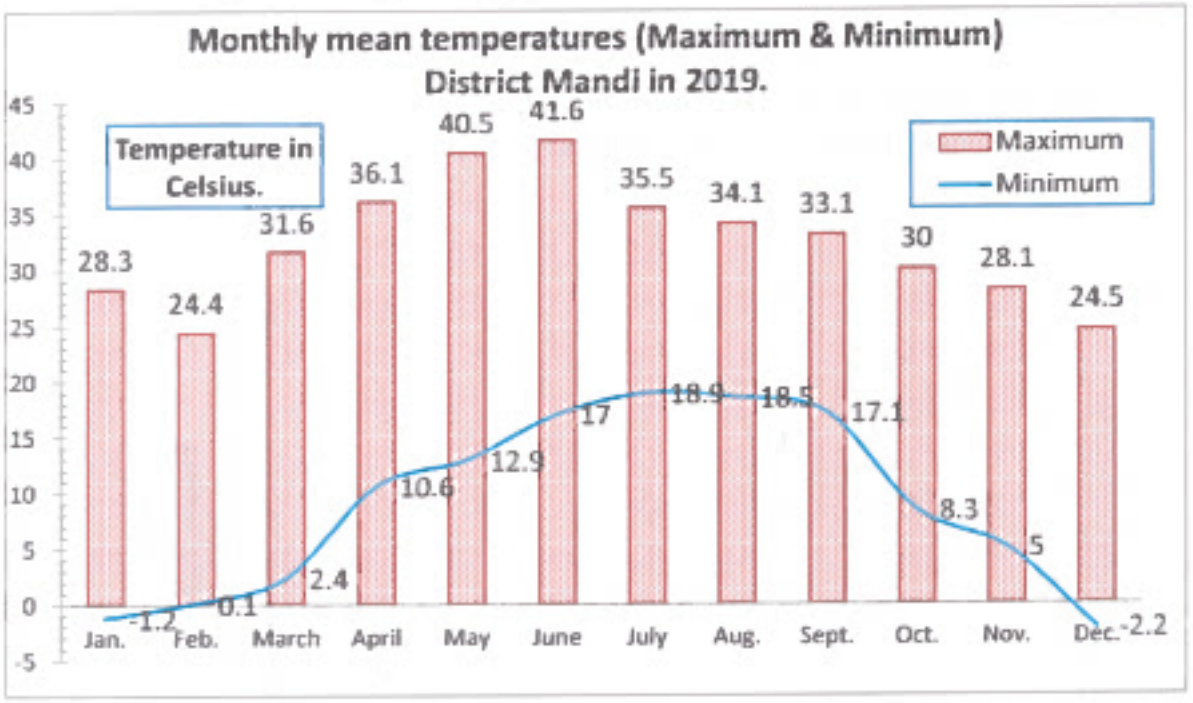

Figure 6: Mean monthly maximum and minimum temperature recorded at IMD station at Sundernagar.

3.4 Rainfall

Rain fall data of Mandi district is depicted in figure 6.

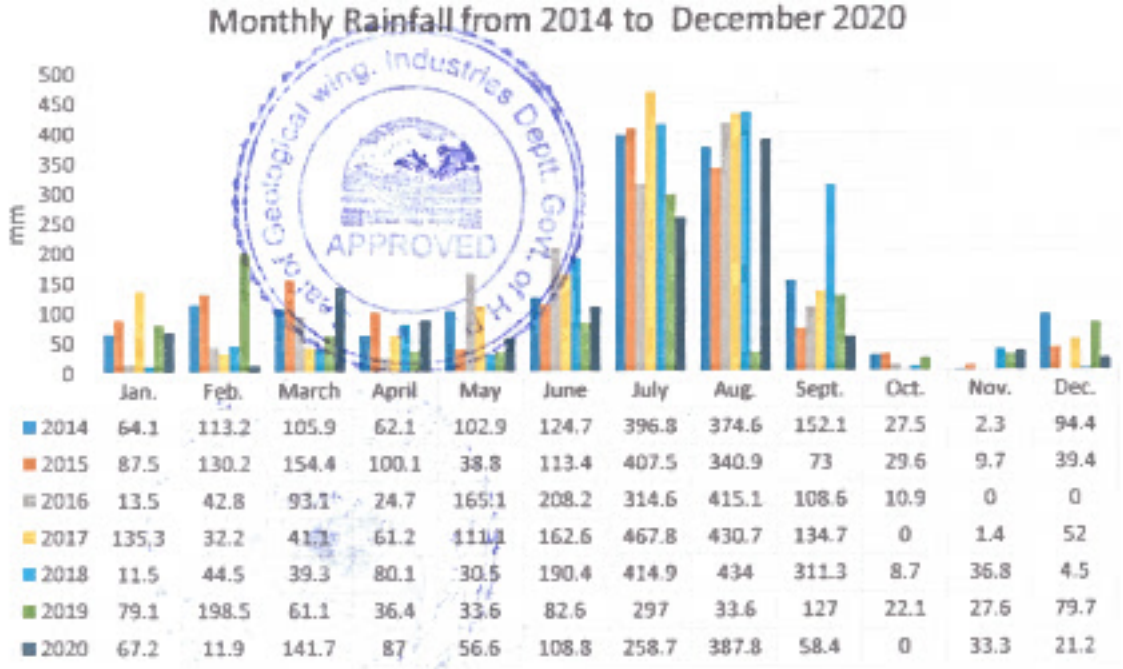

Figure 7: Rainfall of the District.

In addition to District Mandi, the catchment area of Beas River up stream of the

quarry falls in districts of Kullu, Hamirpur and Kangra, monsoon rainfall of these districts is given in figure 8.

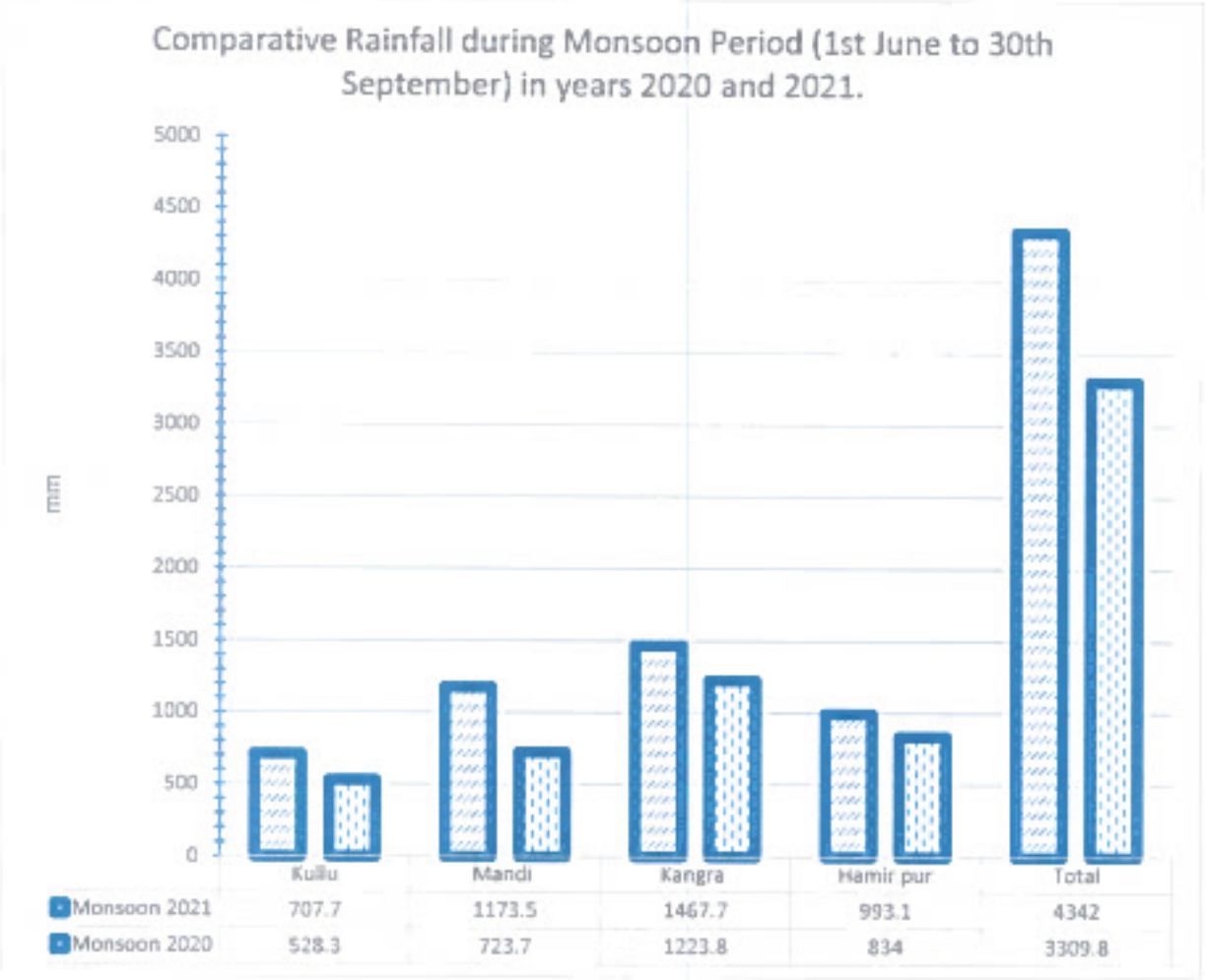

Figure 8: Monsoon rainfall in the catchment districts.

3.5 Any other important feature

The mining lease area falls in riverbed of Beas River and accessibility to the quarry site is through a kutcha road.

2.6 Description of mining area.

Mining area falls in river corridor of Beas River. It is richly endowed with river borne material as it falls in the young stage of the river.

PART I

(1) Description of the area in which the mining lease is situated.

1.1 General

The Lease is situated in the Beas River. Beas River originate at an altitude of 5871 metres above mean sea level at Beas Kund.

Its main tributaries are the Parbati, the Spin and Malana nala in the East; and the Solang, the Manalsu, the Sujoin, the Phojal and the Sarvati Streams in the West. In Kangra, it is joined by Binwa, Neugal, Banganga, Gaj, Dehr and Chakki from North, and Kunah, Maseh, Khairan and Man from the South.

At Bajaura, it enters Mandi district situated on its left bank. In Mandi district, its own Northern feeders are Hansa, Tirthan, Bakhli, Jiuni, Suketi, Panddi, Son and Bather. The northern and Eastern tributaries of the Beas are perennial, and snow fed, while Southern are seasonal. Its flow is utmost during monsoon months. At Pandoh, in Mandi district, the waters of the Beas have been diverted through a big tunnel to join the Satluj. It flows for 256 km. in Himachal Pradesh.

Beas river enters in the Kangra District just at the confluence of Binu Khad with Beas at an elevation of about 636 metre above mean sea level and it flows along the border of Kangra and Hamirpur district up to Nadaun in Hamirpur and then it flows in the Kangra District. The total length of the Beas River in Kangra district is about 123 Km

The catchments of the Beas River have been divided in sub catchments by the Central Ground water Board as shown in figure 7 and table 3.

Figure 9: Catchment & sub-Catchments

1.2 Name of River/ Stream and its gradient in which the Lease is situated

Beas River.

1.3 Drainage System

Beas River

1.4 Type of Drainage

Dendritic

1.5 Origin of River/Stream

Beas River originate at an altitude of 5871 meters above mean sea level at Beas Kund.

1.6 Altitude at Origin

5871 metres above mean sea level at Beas Kund.

Figure 10: Catchment of Beas River in Himachal Pradesh.

1.7 Geometry of the catchment of the river

- Number of tributaries = 62
- Stream order up to Lease area = 5
- Maximum length of water shed = 217 km
- Maximum breadth of water shed = 100 Km
- Length breadth ratio = 1: 2, Higher the ratio, higher is the asymmetry of water shed.

Profile of Riverbed

- Highest point = 6558 M
- Elevation at Lease area = 1609 M
- Total length of River = 315 Km
- Total Elevation Loss = 5408 M
- Average Slope = 14.1 % i.e about 6.3°
- Slope angle at Lease area = about 20°.
- Cycle of erosion at Lease area is Mature.

1.8: The annual deposition at the place of mining:

The area being part of the river which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. *Though at the mining lease site the river is at young stage but as an abundant precaution, keeping in view the variation in rainfall particularly highest rainfall, which generally causes floods, the factor of eight cm annual replenishment is taken into consideration in general.* The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. However, it is generally observed that replenishment of more than eight cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. *Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.*

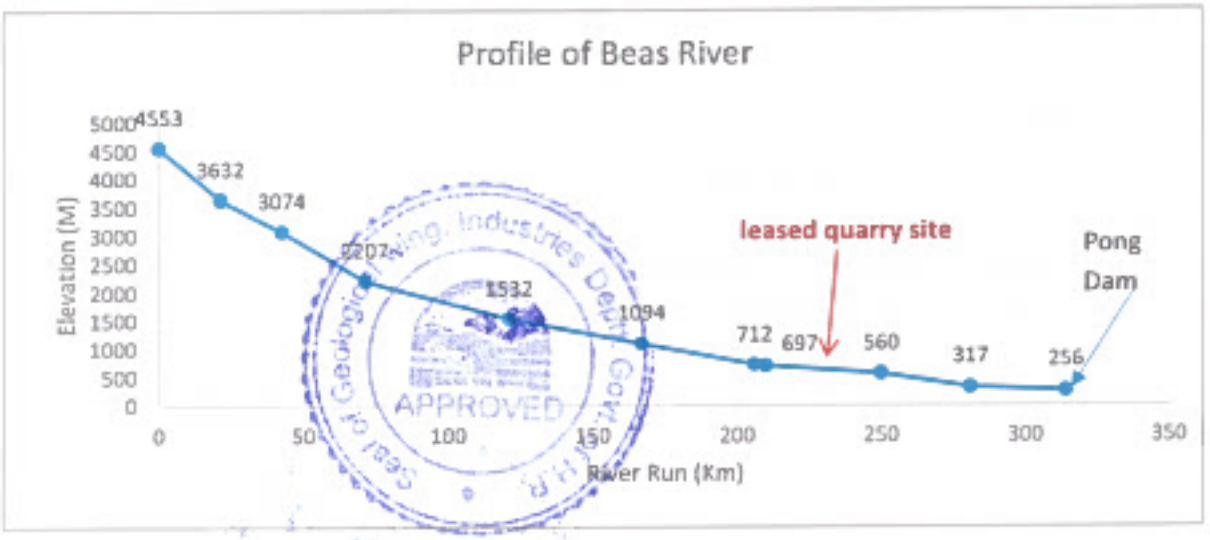

Figure 11: River Profile of Beas

1.9 The Competency of the River/ Stream at the mining site

The general competency at the mining area is eight to ten Kg approx. The largest boulders vary 24 to 130 cm X 36 to 120 cm X 30 to 100 cm (length X Width X height). However, the size of the boulders found in the river is more dependent upon the size available in the boulder conglomerate beds in the catchment area than the actual competency of the flow of the river.

Photo 1
Competency of
the River

1.10 The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

1.11 Altitude of the area is

- The highest contour of lease area is 609 Metres above Mean Sea Level,
- The lowest contour of the lease area is 605 Metres above Mean Sea Level.

1.12 Description of ground water table:

The mining lease area is part of river course. Beas River is a perennial river; therefore, the water flow remains throughout the year. However, water level of surface water as well as ground water table vary from post monsoon to pre-monsoon period. The ground water table vary from surface to 1.5 metres BGL depending upon, season, elevation, and distance from surface flowing water.

2.0 GEOLOGY

2.1 Regional Geology.

The Himalayan Mountain system roughly surrounds the northern India. The mountain ranges extend for over 2400 km length from west to east. Geology of the Himalayas is extremely complex as it represents a site of continental collision. The collision of the Indian Plate and the Eurasian Plate led to joining of the two continents along a suture zone represented by a lineament. Two rivers – Indus in the west and Tsangpo in the east flow along this lineament which is also known as Indus suture zone. We will study the geology of the terrain between the Indus suture zone in the north and the Indo-Gangetic alluvial plains in the south.

Tectonically the Himalayas can be divided into four roughly parallel zones. From north to south the zones are:

- Tethyan Himalayas
- Central Crystalline Zone
- Lesser Himalayas
- **Error! Hyperlink reference not valid.**

The Central Crystalline Zone is made of Precambrian basement rocks mixed with granitic intrusions of Tertiary age. This zone has the highest mountain ranges of the Himalayas. This zone separates the northern Tethyan Himalayas from the southern Lesser Himalayas. These two zones contain sedimentary rocks of Palaeozoic-Mesozoic ages deposited over Precambrian basement.

Whereas the Tethyan Himalayas consists of a fairly continuous succession rich in fossils, the Lesser Himalayas host rocks with scanty fossil records and with gaps in between. The Outer Himalayas forms a separate geological unit consisting of Quaternary sedimentary rocks originating from the rising Himalayas.

Each of these zones displays a highly complex geology disturbed by the Himalayan Mountain building processes. The geology of the Lesser Himalayas is particularly difficult to decipher because it contains several thrust sheets or nappes and is generally devoid of fossils.

GEOLOGICALLY Himachal Pradesh can be broadly divided into two major geo-tectonic zones viz. the Lesser Himalayan Tectogen in the south and the Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectonic break collectively designated as Main Central Thrust in the sense defined by Srikantia (1988). Mandi District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterozoic to Quaternary. The oldest rocks are of undifferentiated Proterozoic age, comprising carbonaceous phyllite, schist, gneiss, quartzite, and marble. The Ghoghar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Meso- Proterozoic age is represented by quartzite with basic flows. The Shali Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at

places stromatolites) slate, & quartzite. The Subathu consists mainly, of olive-green shales and grey shales. At the top, a band of white quartzite is exposed; this band of white quartzite has been taken as the marker, defining the top of the Subathu sequence. The thick sequence of brackish and freshwater sediments immediately succeeding the fossiliferous marine Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Miocene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles, and cobbles occurring along present channels of Middle to Late Pleione and Holocene age.

2.2 Geology of area

The local geology & stratigraphy of the area is given in the figure 6. The rocks in the surrounding area belong to the Tertiary formations.

2.3 Local Geology of the leased area

The leased area forms a part of the riverbed covered with boulders, cobbles, pebbles, river born bajri, and sand and clay deposit of Channel alluvium. The rocks in the catchments of Beas River is of in the upstream side, in the effective catchment belongs mainly to Kullu group, Larji Group, Rampur group, Vaikrita group and tertiary group. The area is comprising predominantly the quartzite Boulders, Sand and river born bajri of catchment rocks. The rock nears the quarry area belong to tertiary formations.

The boulders are white, spotted white, greenish white, pink, purple and dark green in color.

2.4Nature of the Boulder/ Cobble/ Sand

The area lies within the regular course of the Beas River gets flooded in the rainy season.

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour. Quartzite fragments are rounded, sub-rounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit is more than five metres.

During the monsoon, the riverbed replenishes by the eroded rocks from the pre tertiary Formations. Due to sudden decrease in the carrying capacity and competency of the river after monsoon floods, the annual deposition of six to eight cm is received.

2.5 The Nature of the rock along the bank

The rocks along the bank belong to tertiary formations consisting of claystone, sandstone, and conglomerate.

Geological Map of the Quarry Region.

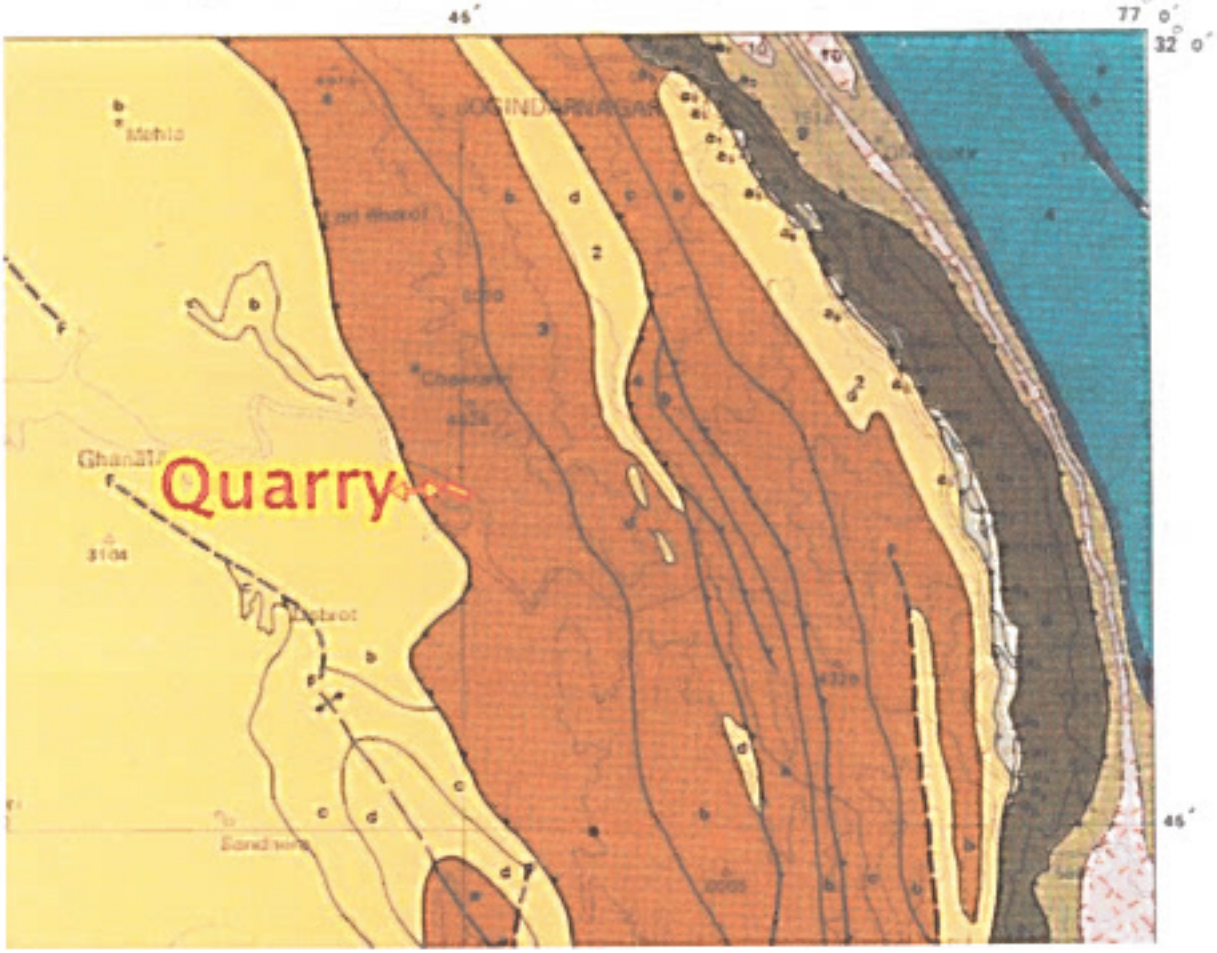

Figure 12: Geological Map of the surrounding lease area.

Photo 2: Nature of the Boulder/ Cobble/ Sand in the Beas River.

Photo 3: Part of quarry Area.

2.4Nature of the Boulder/ Cobble/ Sand

The area lies within the regular course of the Beas River gets flooded in the rainy season

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2.5 The Nature of the rock along the bank

The rocks along the bank belong to tertiary formations consisting of claystone, sandstone, and conglomerate.

Photo 4Nature rocks near banks

2.6 Estimate Annual Deposition of Mineral

The area being part of the river which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. As abundant precaution, keeping in view the variation in rainfall particularly highest rainfall, which generally causes floods, the factor of eight cm annual replenishment is taken into consideration in general. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. However, it is generally observed that replenishment of more than eight cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. *Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.*

3. RESERVE ESTIMATE

3.1 General Consideration

The basic requirement of the leased or will be stone, bajri and sand for construction of Project.

3.2 Percentage wise distribution of Mineral:

The table below shows the percentage wise distribution of minerals and figure 9 depicts the pie chart for the same.

Table shows the percentage wise distribution of minor minerals:

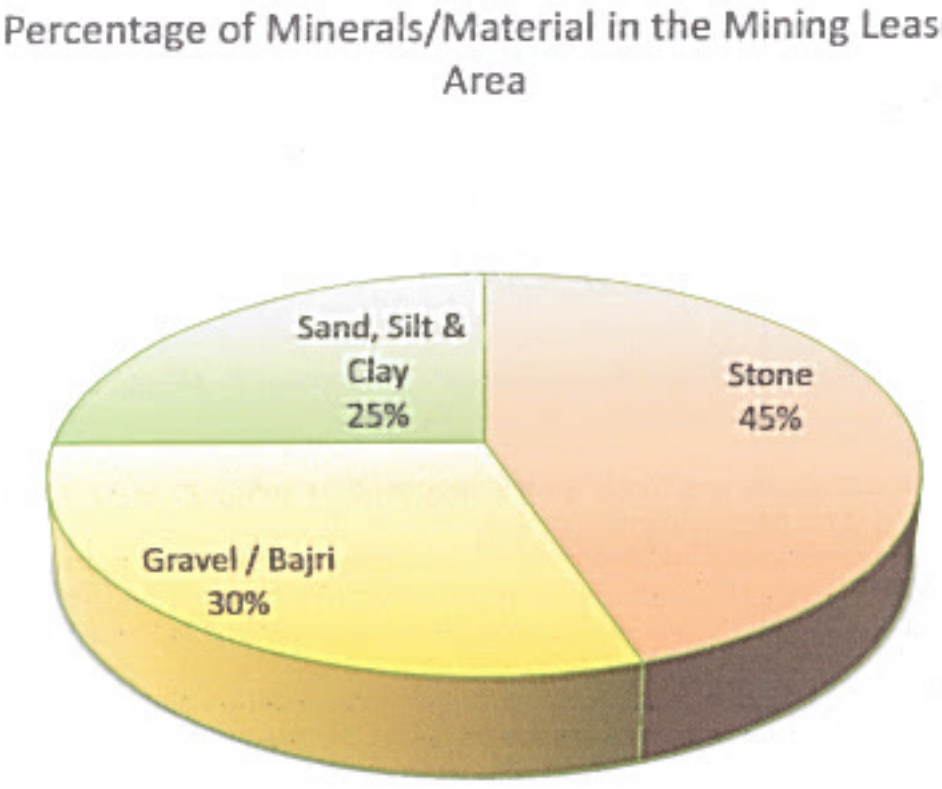


Figure 13: Percentage of each category of mineral present in the leased area.

1	Stone	45%
2	Gravel / Bajri	30%
3	Sand, silt & clay	25%

3.3 Estimate of Geological Reserve

The entire block falls within the river corridor. Thus, the mining leased area of 40969 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than 5 metres. However, considering for purpose of

estimation of Geological reserves to a depth five metres and specific gravity to be 2.25, the Geological deposits in the area are to a tune of about 463579, metric tons as shown in the chart.

Geological Reserves			
Geological Reserves	**Thickness, in metres**	**leased Area (Square Metres)**	**Reserves Rounded off (In tonnes)**
Proved	**5**	**41207**	**463550**
Specific Gravity 2.25			
Formula = Surface area X thickness/depth X specific gravity = Reserves			

3.4 Estimate of Mineable reserves of boulders, Bajri and Sand

The basic requirement of the leased or is sand, stone and bajri. As per the policy guidelines issued by the State Government for Mining of River / Riverbed and to calculate the mineable reserve the following points are taken into consideration: Adequate safe distance has been provided from the points of utilities as per Rules and guidelines.

As per the policy guidelines issued by the State Government for Mining of River / Riverbed,

- ✓ In this case only one-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- ✓ Mining is not permitted within 1/10th of riverbed or 5 meters from the banks (HFL) of the river / River whichever is higher. The width of the river in leased area is 195 to 230 meters; thus, no mining is proposed in the area up to 20 to 23 meters from the banks.
- ✓ The water table level will go down as the water recedes after the monsoons.
- ✓ The depth of water table will be at lowest in the pre-monsoon season
- ✓ A geological map on 1:2000 scale is prepared and main litho units were marked on the plan to know the surface spread of each unit.
- ✓ The entire width of the river gets flooded during heavy rains in monsoons. The mined area gets replenished in the very early floods in the beginning of the monsoon season.

The total mineable area and deposit is shown in figure 12, table 7 and figures 13.

- ***The part of the area, i.e., 32500 square metres of lease area, is mineable as it falls within the river corridor, leaving out the safety zone provided along the banks.***

Seal of Geological Wing, Industries Deptt. Govt. of H.P. APPROVED

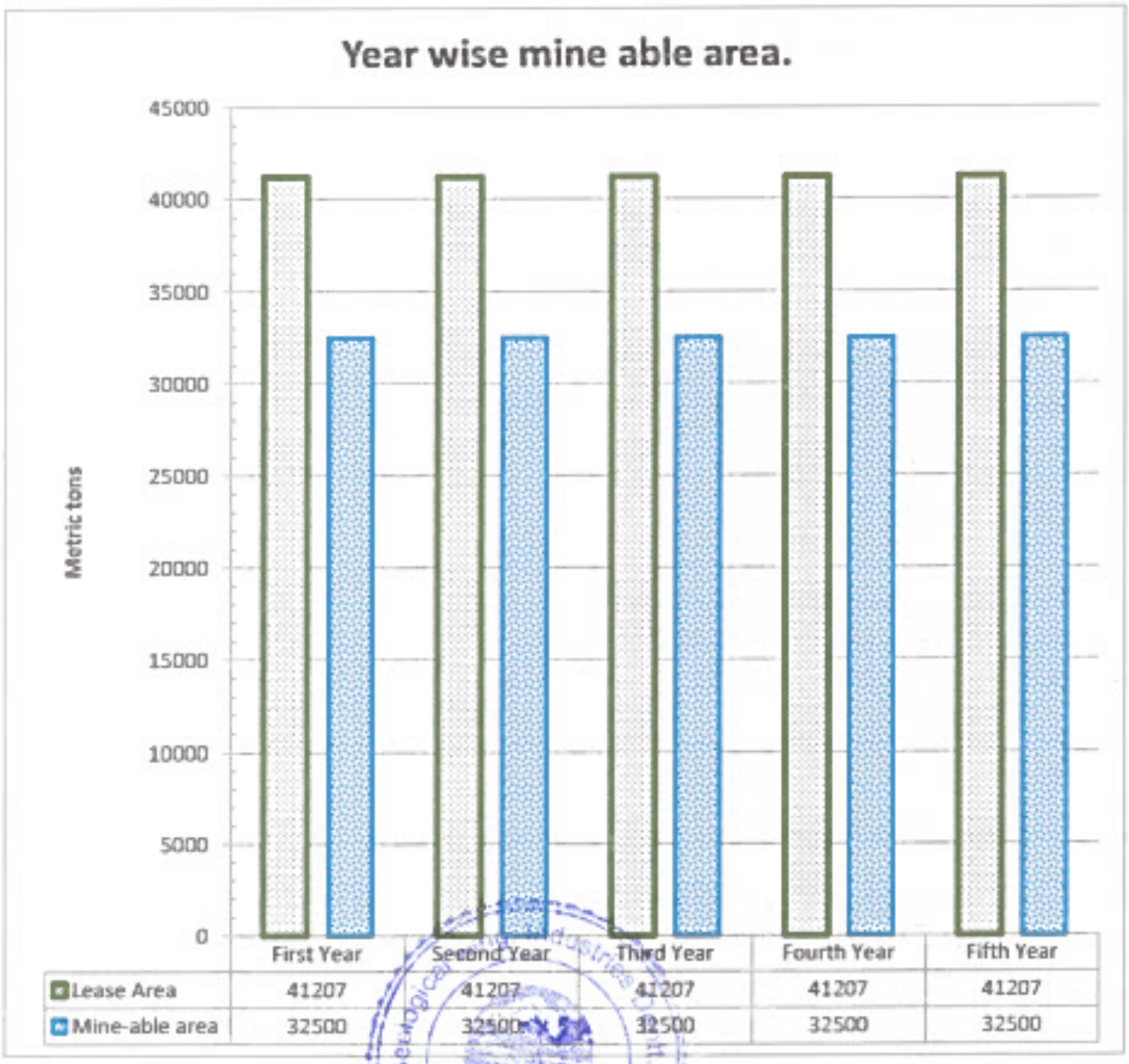


Figure 14: Mineable area.

Table 7 Mineable reserves in the block

Leased Area Sq. metres	Mineable Area Sq. Metres	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
41207	32500	32906	31937	15282	48825

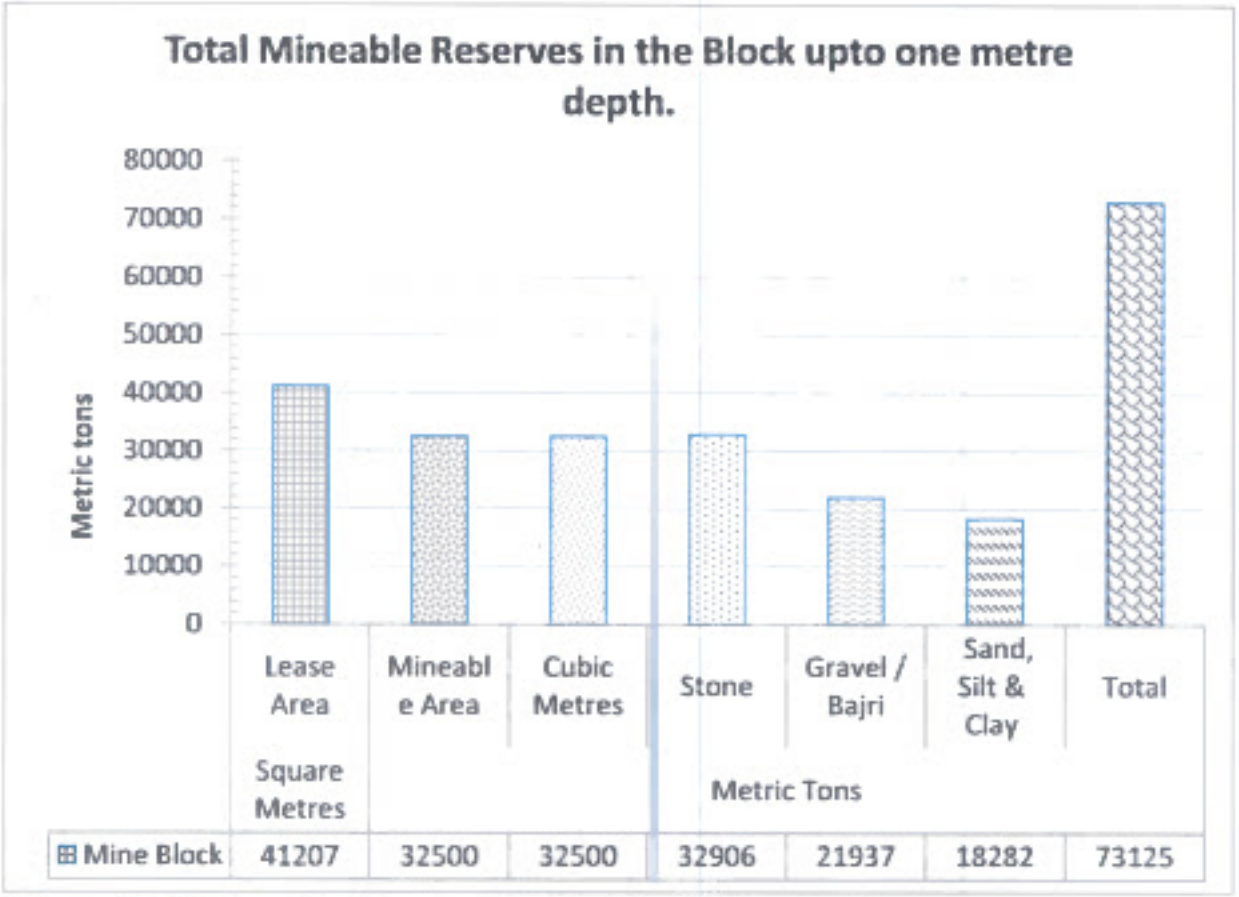


Figure 15: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 32500 square metres contains 32500 tonnes of mineable material. The entire mine able block will be mined every year.

3.4a Depth of mining

The Rule 34 (IV) of Rules stipulates '*the depth of mining in the riverbed shall not exceed one metre or water level whichever is less*'.

One metre **maximum** depth from the surface is considered for mining of the reserve.

3.4b. Specific Gravity

The specific gravity of Quartzite boulder/stones is 2.65 and of sand is 1.85. Hence average specific gravity of **2.25** is taken for calculation of the deposit.

3.5. Estimate of Annual deposition

The reserves of all the constituents of leased block have been calculated for the safe mine-able area to be 73125 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure16. ***Depending upon normal rainfall from year to year causing erosion in the catchments***

and flooding of Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

Figure 17 shows the proposed production of materials in five years.

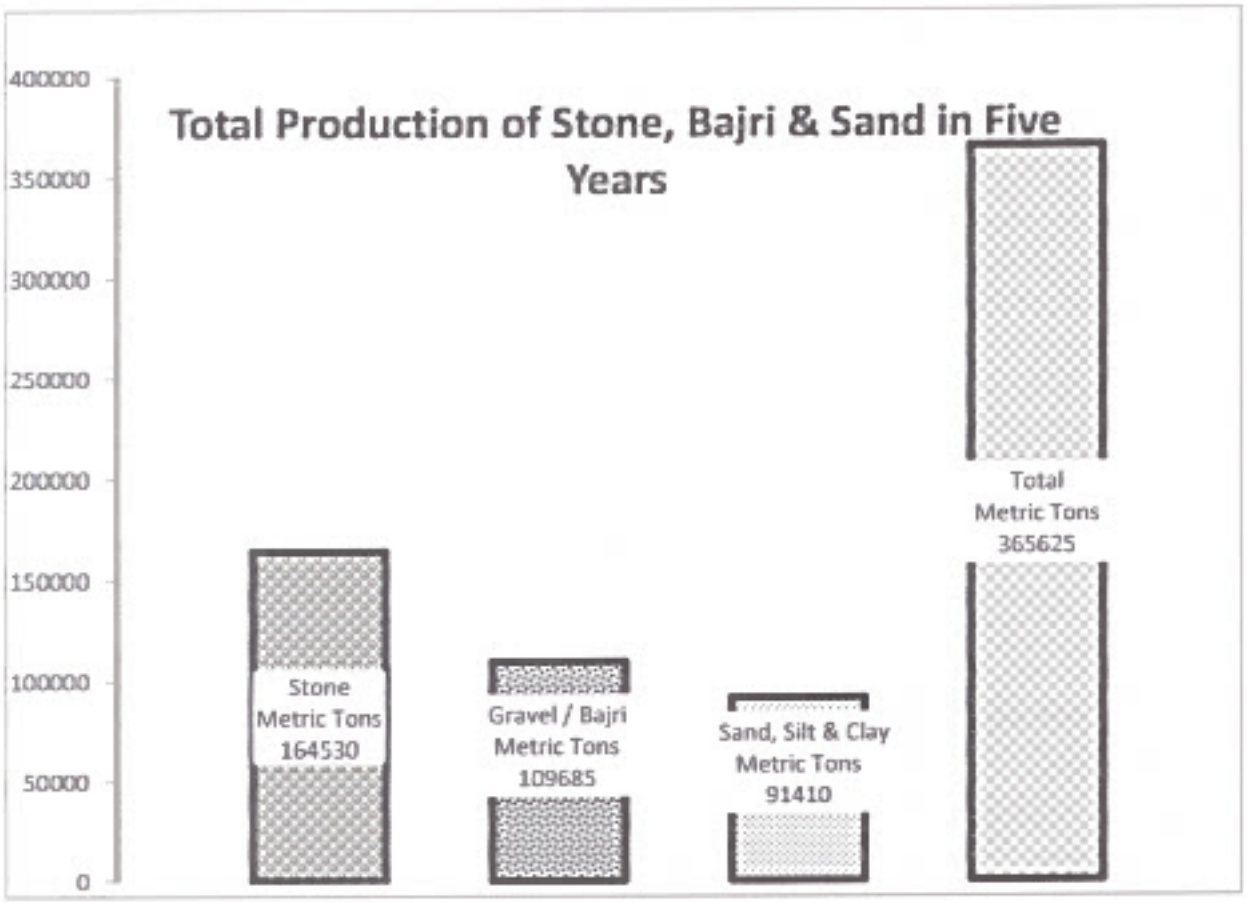


Figure 16:Proposed production of total material in five years

4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent semi mechanical. Normally it has been observed that a worker can mine/excavate about three to four tonnes of material in a day. To excavate 180 tonnes of material in a day 45/60 workers would be required. Working of so many persons in a small area would cause congestion and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to both manual as well as mechanically. Workers are mainly deployed in riverbed mining for extraction and for loading of extracted material into tipper truck and tractor trolleys loader/ JCB will be operated. Drivers/ Operators for loaders, tippers and tractors will be another category of workers.

Considerations

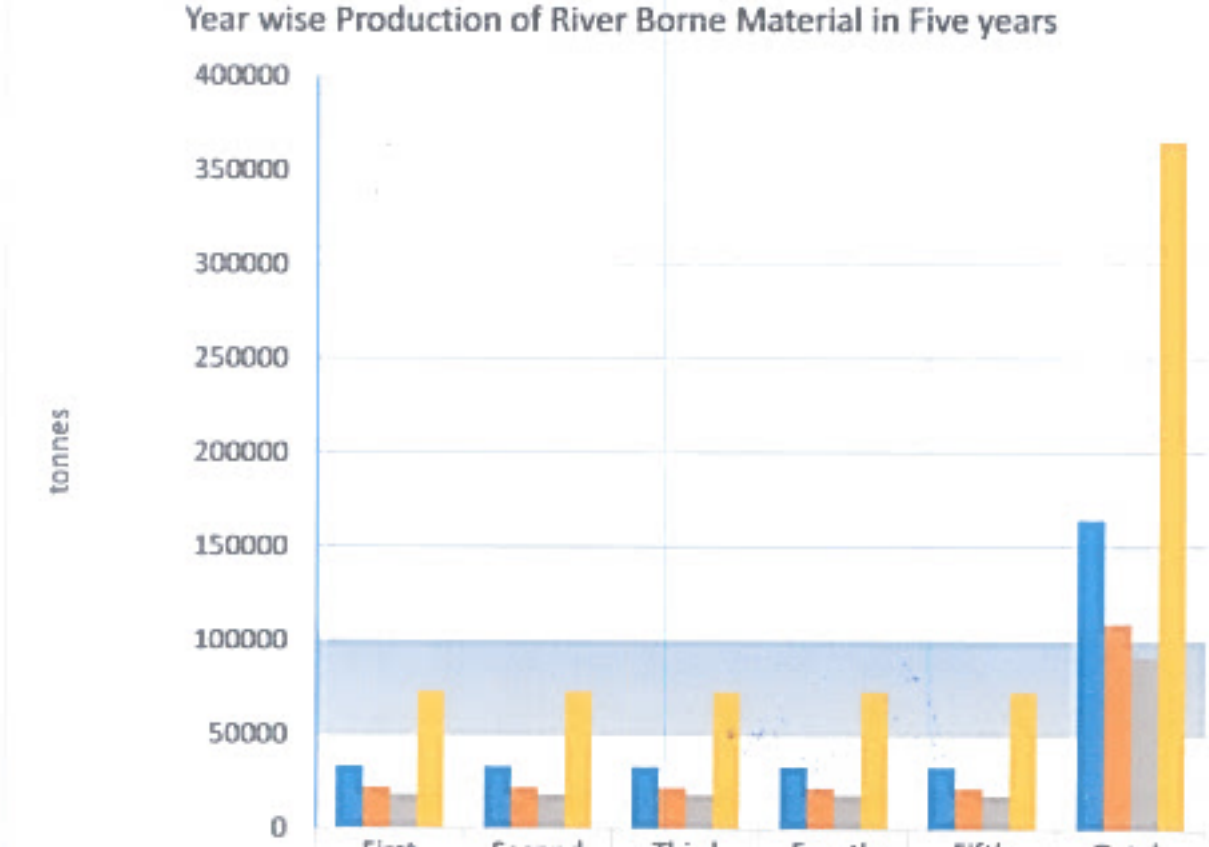
- No blasting is required.
- Only manual/semi mechanically extraction of RBM (River Borne Material) will be undertaken.

- Trenches and pits for the mining purposes shall be made in such a way so that these are not deeper than one metre and follow the general / normal channel direction of the river and bottom is above the water table.
- With the replenishment of the pits and trenches during the floods, the process of controlled mining can continue year after year. The erosion and weathering of rocks in the catchments have inexhaustible supply of required minerals.
- Mining activity will be undertaken only during the dry seasons and dry parts of the river.

4.1 Development and Production Programme for 5 years

The proposed production for the first five year is as given in the figure 13 and Table 6 below show the production of Minerals in five years.

4.1a Year wise Production



	First	Second	Third	Fourth	Fifth	Total
Stone	32906	32906	32906	32906	32906	164530
Gravel / Bajri	21937	21937	21937	21937	21937	109685
Sand, Silt & Clay	18282	18282	18282	18282	18282	91410
Total	73125	73125	73125	73125	73125	365625

Figure 17:Year wise Availability of Materials (in Metric tons).

Table 3 Year wise production of materials.

Year	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
First	32906	21937	18282	73125
Second	32906	21937	18282	73125
Third	32906	21937	18282	73125
Fourth	32906	21937	18282	73125
Fifth	32906	21937	18282	73125
Total	164530	109685	91410	365625

The proposed production is sufficient to for sustaining a viable mining project.
The year wise mine working planned for the Quarry is presented in the map 3.
Year wise production of River Borne Material, sand, stone and bajri is given in figures 18, 19, 20, 21, & 22.

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4.2.a Development and Production at end of first Year.

- ✓ Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - ➢ 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - ➢ 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - ► About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - ► The entire lease area falls within the river corridor, therefore some retaining walls (C-1 in first year) would be erected outside the lease area near *in situ* rocks on left bank.

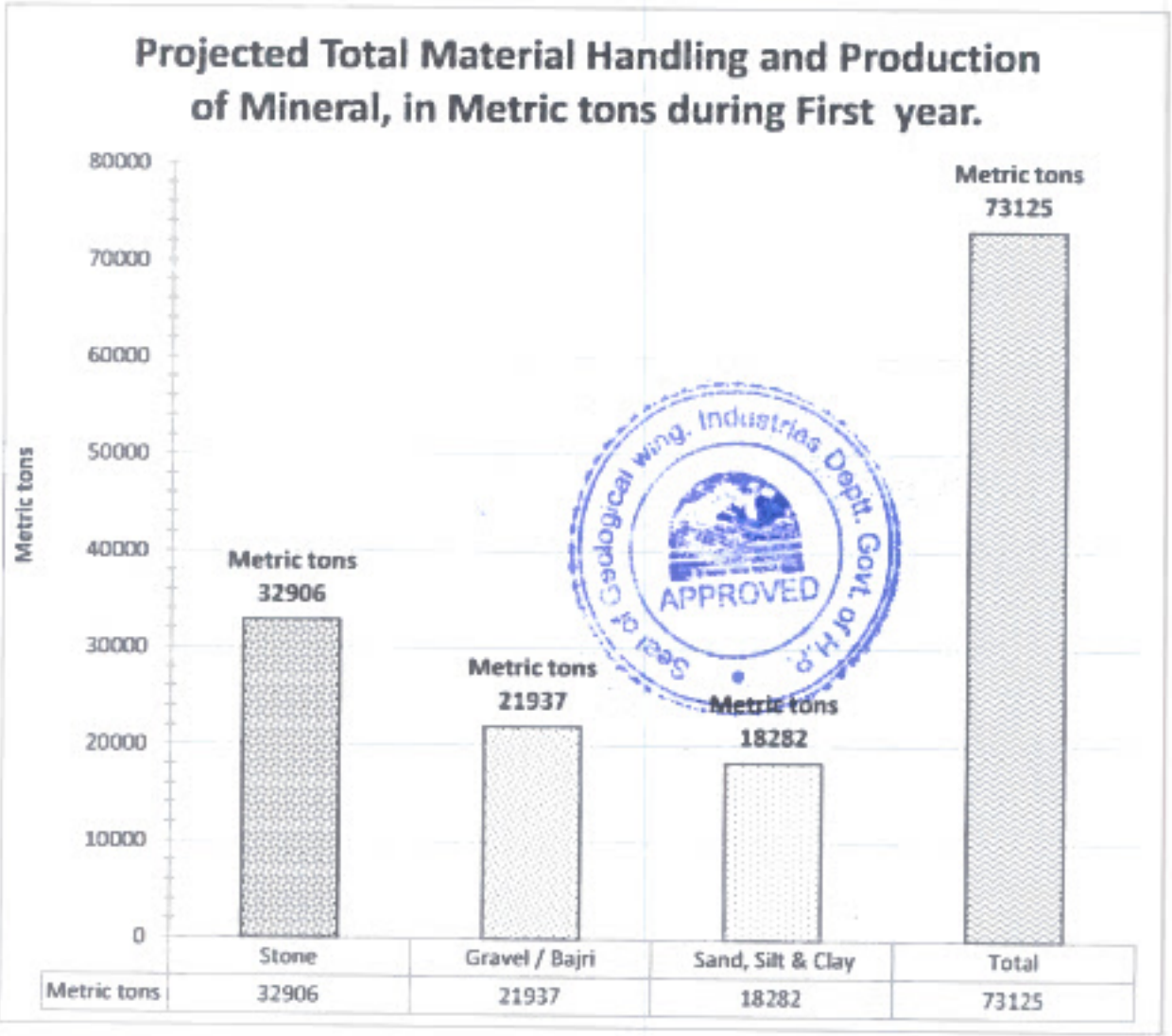


Figure 18- Proposed Production and Material Handling in the First Year of Mining.

4.2. b Development and Production at end of second Year.

During 2nd year of development and production programme:

- ✓ Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - ➢ 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - ➢ 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - ► About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - ► The entire lease area falls within the river corridor, therefore some retaining walls (C-2 in second year) would be erected outside the lease area near *in situ* rocks on left bank.

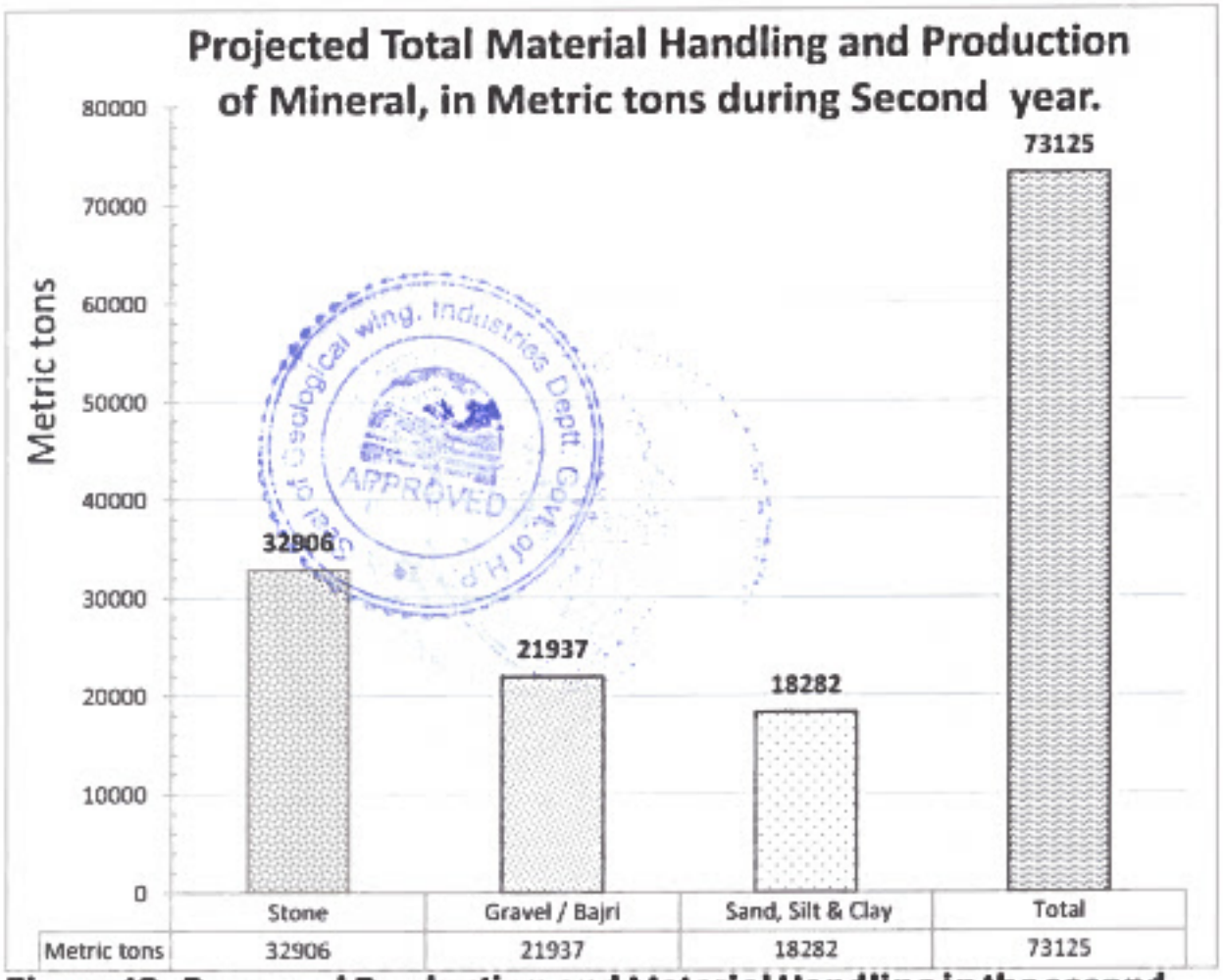


Figure 19- Proposed Production and Material Handling in the second Year of Mining.

4.2 c Development and Production at end of third Year.

During 3rd year of development and production programme:

- ✓ Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - ➢ 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - ➢ 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - ► About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - ► The entire lease area falls within the river corridor, therefore some retaining walls (C-3 in third year) would be erected outside the lease area near *in situ* rocks on left bank.

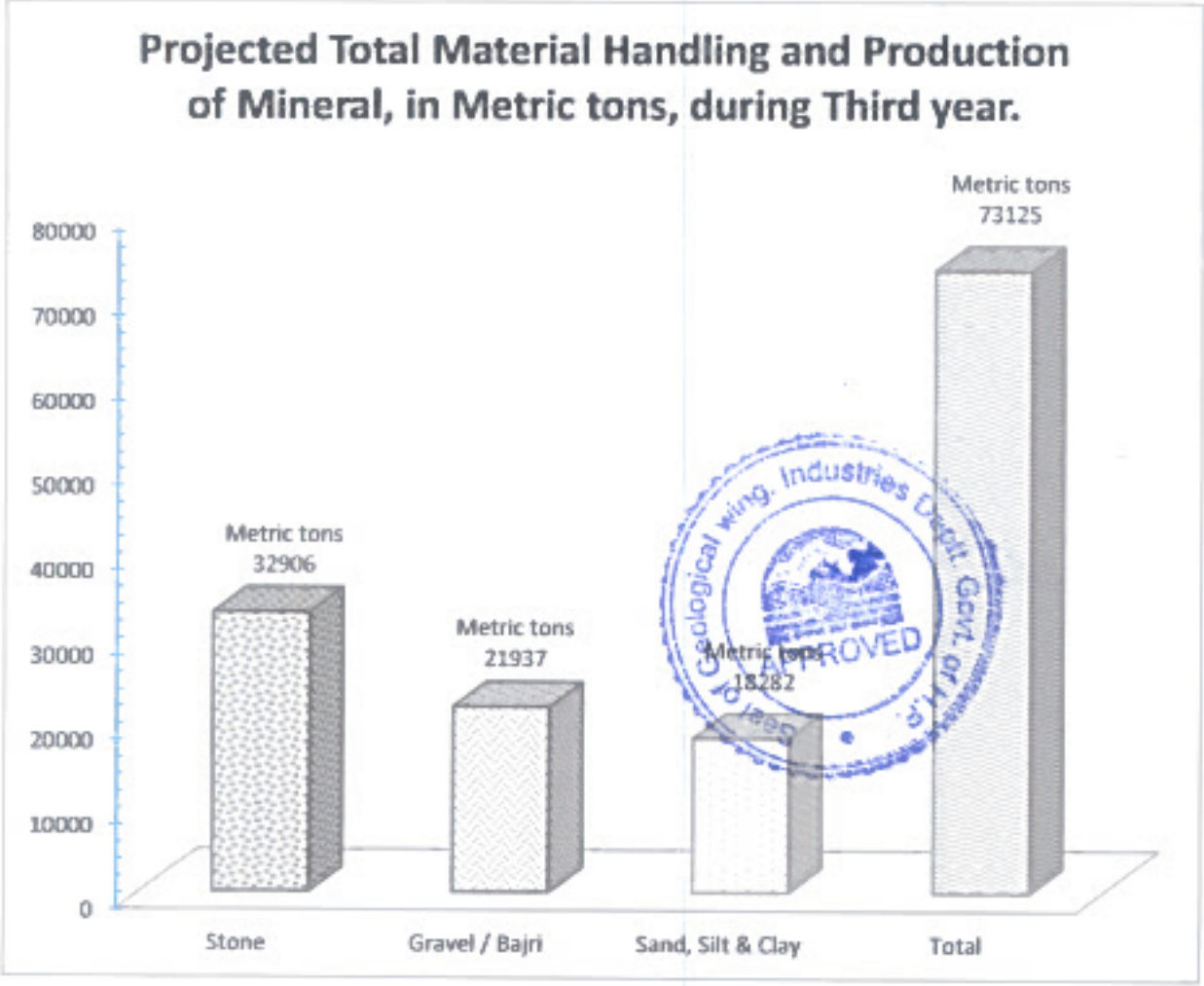


Figure 20- Proposed Production and Material Handling in the Third Year of Mining.

4.2 d Development and Production at end of fourth Year.

During 4th year of development and production programme:

- ✓ Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - ➢ 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - ➢ 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - ► About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - ► The entire lease area falls within the river corridor, therefore some retaining walls (C-4 in fourth year) would be erected outside the lease area near *in situ* rocks on left bank.

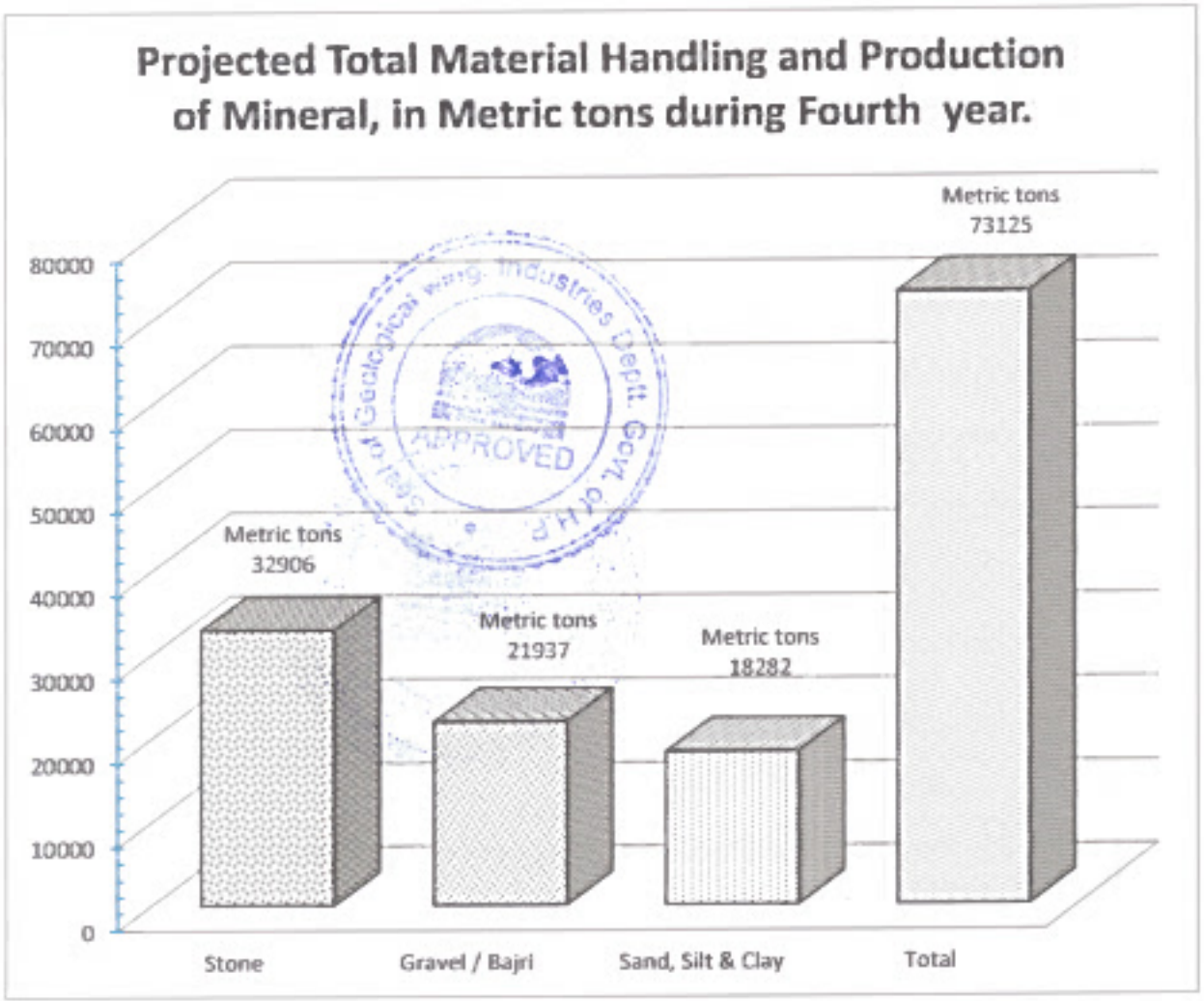


Figure 21- Proposed Production and Material Handling in the Fourth Year of Mining.

4.2 e Development and Production at end of fifth Year.

During 5th year of development and production programme:

- ✓ Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - ➢ 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - ➢ 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - ► About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - ► The entire lease area falls within the river corridor, therefore some retaining walls (C-5 in fifth year) would be erected outside the lease area near *in situ* rocks on left bank.

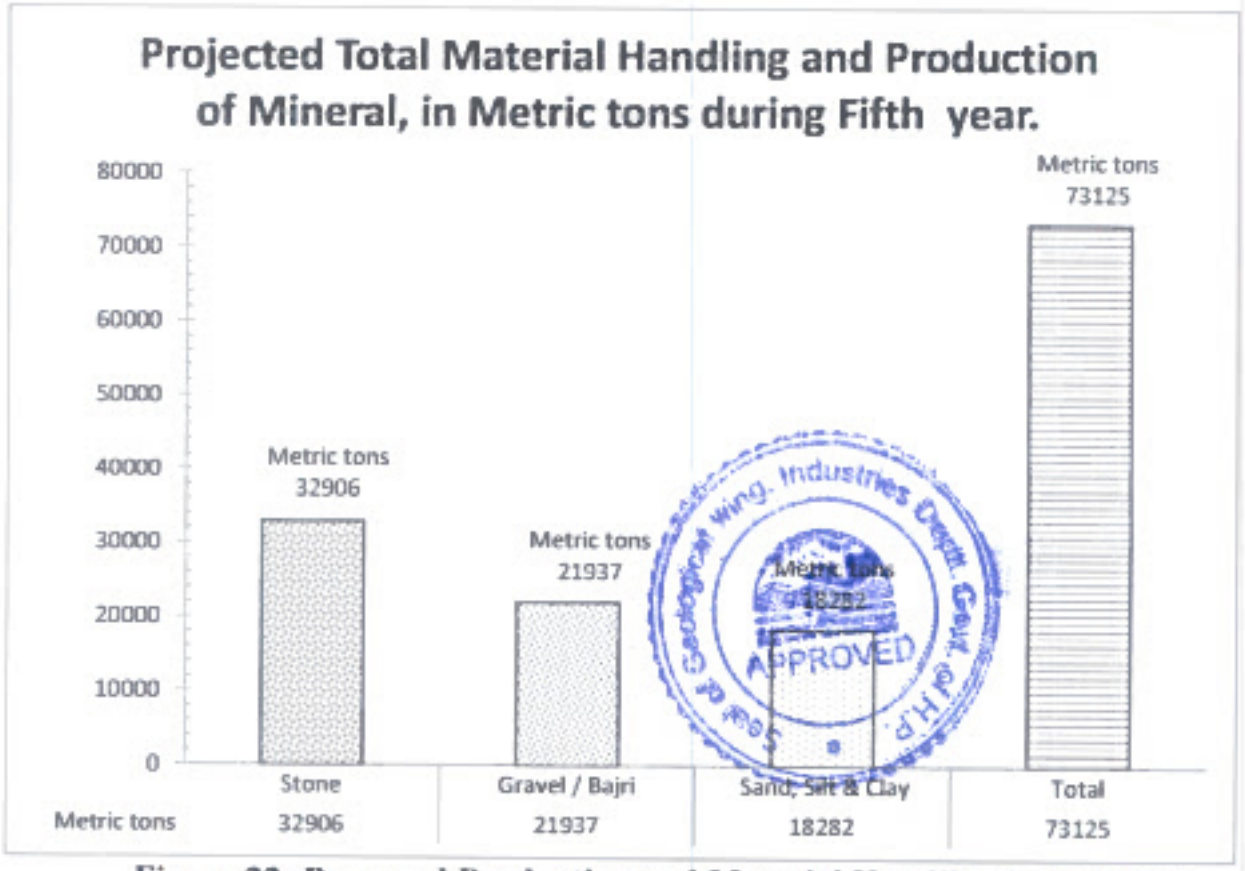


Figure 22- Proposed Production and Material Handling in the Fifth Year of Mining.

4.3 End Use of Mineral

The extracted mineral stone, sand and Bajri for will consumed in the Project construction activities.

Figure 23: Year wise production of Stone.

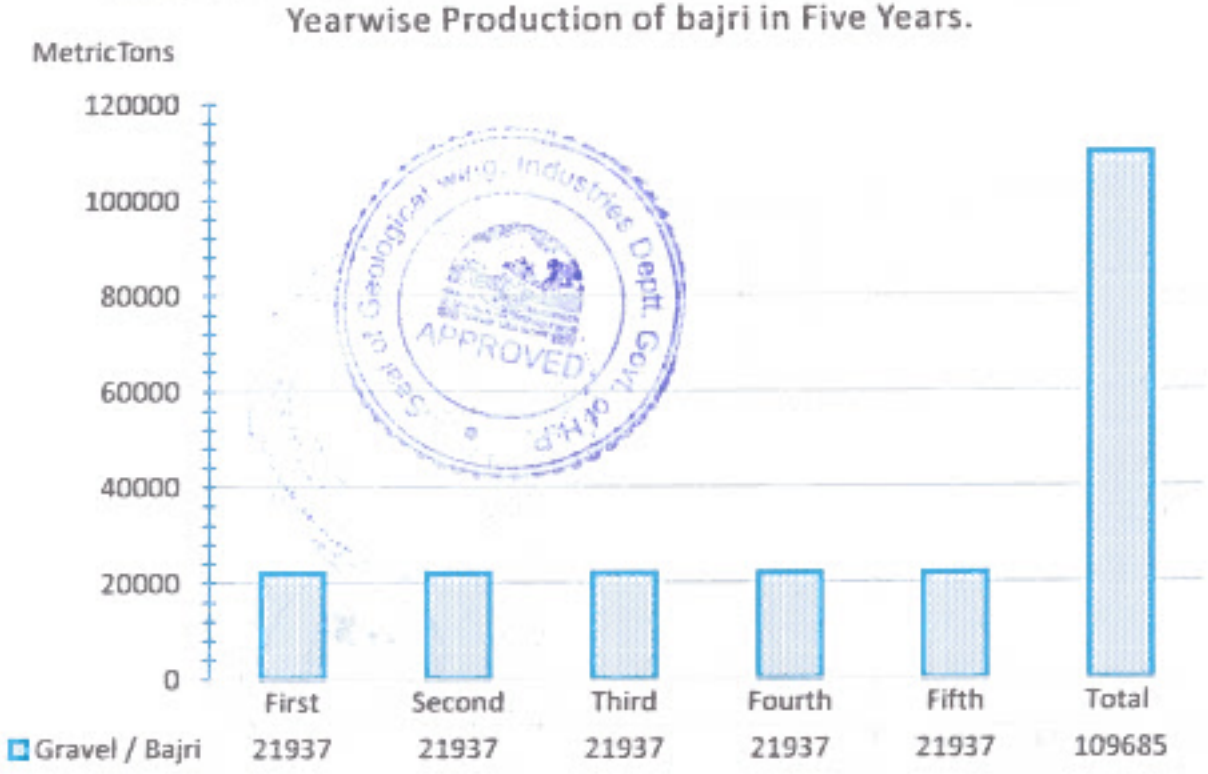


Figure 24: Annual Production of Bajri.

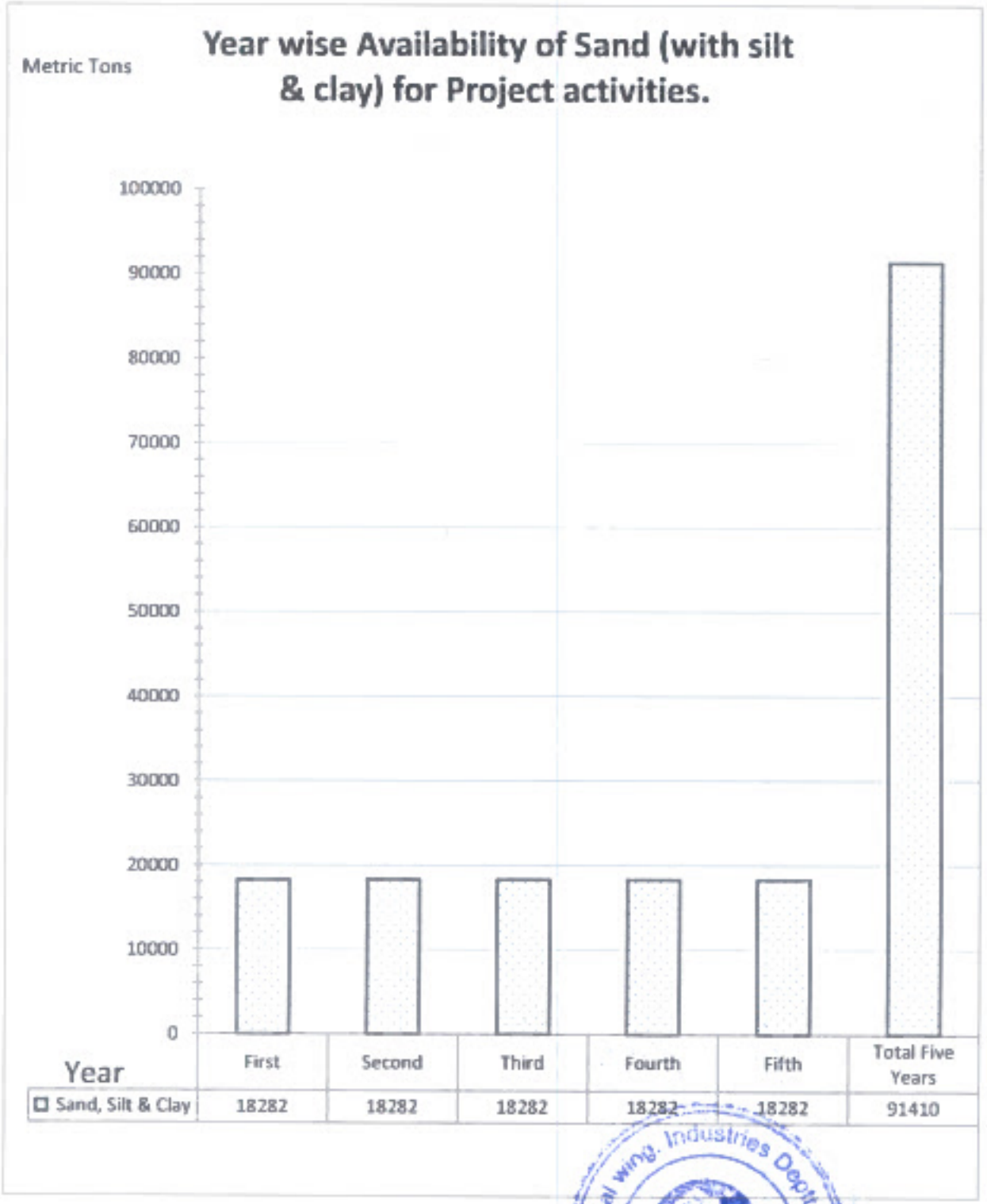


Figure 25: Annual production of sand along with silt & clay

4.4 Detail of road Transport

The maximum total extraction of minerals stone, sand and bajri for use in the Project would be 73125 tonnes or 271 metric tonnes per day, considering 270 working dry days. Thus, about 30 tipper truck trips would be required to move the material from quarry to crusher /

construction sites. The track through River is about 100 metres from the leased area to roadside. The evacuation route is shown in figure 26.

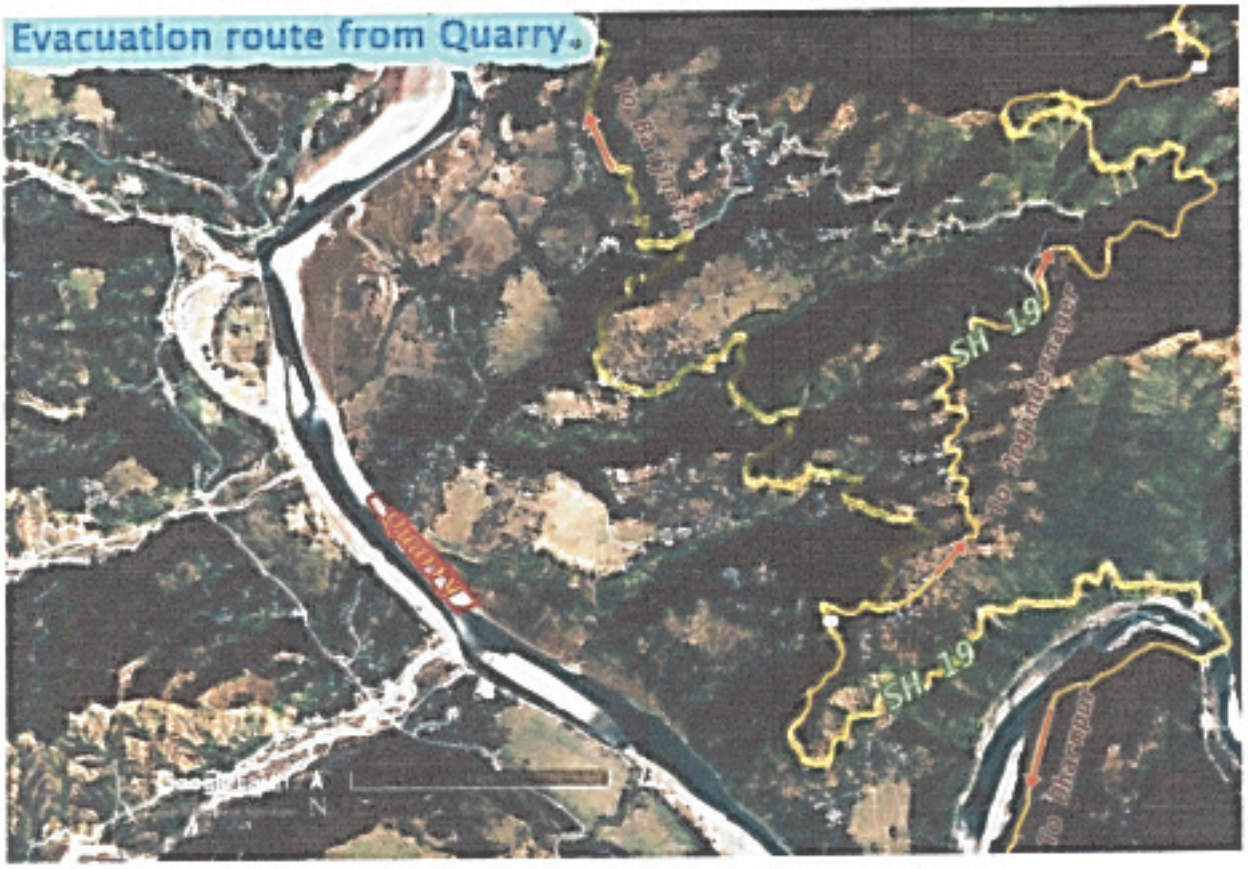


Figure 26. Evacuation route Map

PART II

Environment Management Plan

1.0 Base Line Data

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below: -

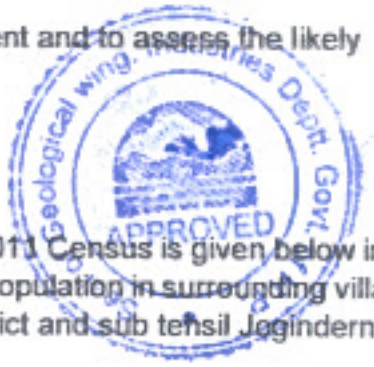
- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate - Temperature
  - Rainfall
  - Wind Speed
- Air Quality
- Noise level
- Visual Impact
- Socio- economic Impact

Accumulation of Scree - Mine Waste.

The base line information of the existing environment was collected from various sources such as

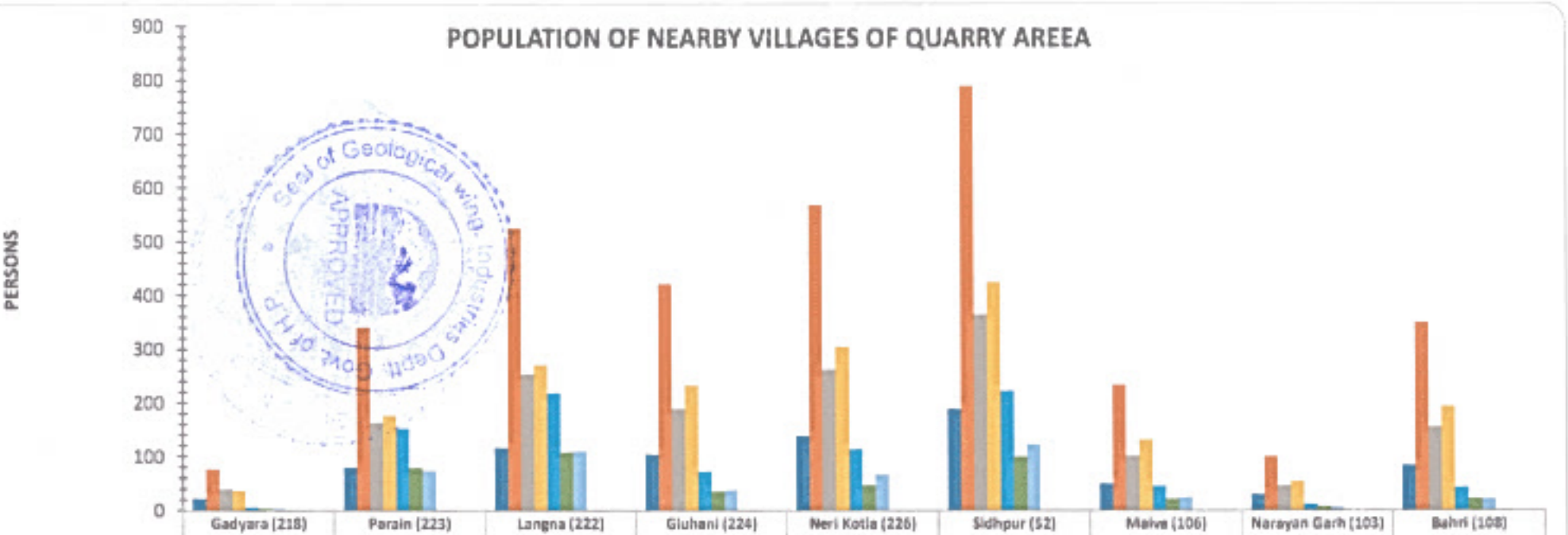
- ✓ Census Department, Government of India.
- ✓ Department of Economics and Statistics, Government of Himachal Pradesh.
- ✓ Directorate of Land Records, Government of Himachal Pradesh
- ✓ Directorate of Horticulture. Government of Himachal Pradesh
- ✓ Fishery Department, Government of Himachal Pradesh
- ✓ Forest Department Government of Himachal Pradesh
- ✓ Animal Husbandry Department, Government of Himachal Pradesh
- ✓ Survey of India, Government of India
- ✓ Metrological Department Government of India

to have in depth understanding of the existing environment and to assess the likely impact of mining activity in the Area



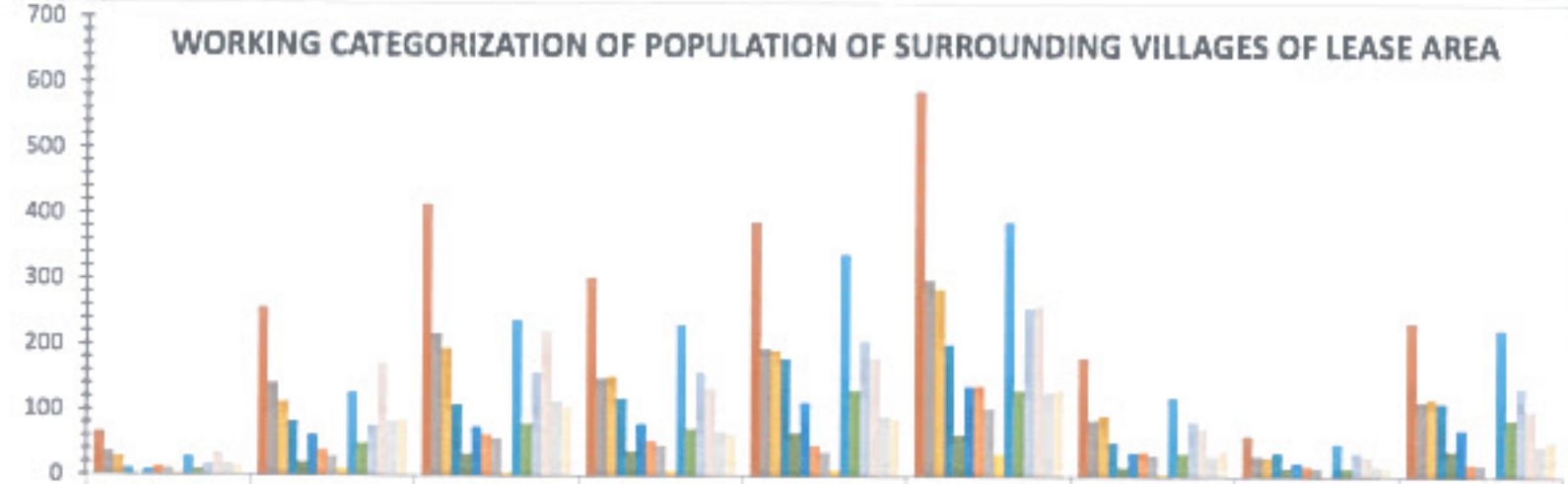
1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Census is given below in the figure 27. Education wise and employment wise break of population in surrounding villages is given in figure 28. The population details of Mandi District and sub tehsil Jogindernager is given in figure 29.



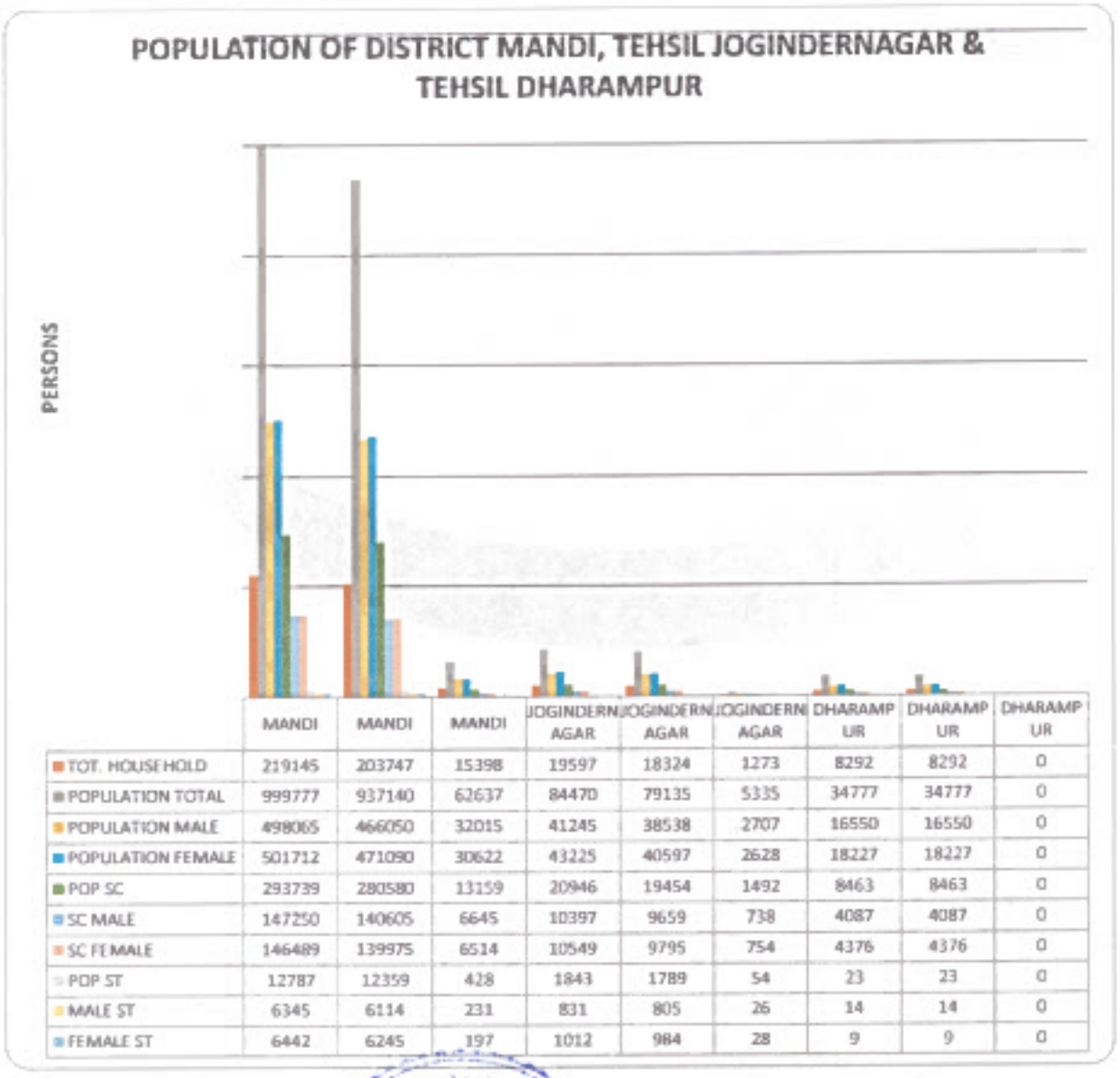
	Gadyara (218)	Parain (223)	Langna (222)	Gluhani (224)	Neri Kotla (226)	Sidhpur (52)	Maiva (106)	Narayan Garh (103)	Bahri (108)
	JOGINDERNAGAR					DHARAMPUR			
TOT. HOUSEHOLD	22	80	117	105	139	189	50	30	84
POPULATION TOTAL	77	341	525	422	569	790	234	100	350
POPULATION MALE	40	164	254	189	263	365	102	46	156
POPULATION FEMALE	37	177	271	233	306	425	132	54	194
POP SC	6	153	219	73	114	223	45	12	43
SC MALE	3	79	109	35	47	100	21	7	22
SC FEMALE	3	74	110	38	67	123	24	5	21
POP ST	0	0	0	0	0	0	0	0	0
MALE ST	0	0	0	0	0	0	0	0	0
FEMALE ST	0	0	0	0	0	0	0	0	0

Figure 27; Population of the villages of the zone of influence.



	Gadyara (218)	Parain (223)	Langna (222)	Giuhani (224)	Neri Kotla (226)	Sidhpur (52)	Maive (106)	Narayan Garh (103)	Bahri (108)
	JOGINDERNAGAR					DHARAMPUR			
POP LITERATE	66	257	413	303	389	588	181	63	236
MALE LITERATE	38	143	219	150	196	301	87	32	115
FEMALE LITERATE	28	114	196	153	193	287	94	31	121
POP ILLITERATE	11	84	110	119	180	202	53	37	114
M_ILL	2	21	35	39	67	64	15	14	41
F_ILL	9	63	75	80	113	138	38	23	73
MAINWORKER	14	41	64	56	48	139	39	17	21
MAINWORKER MALE	11	30	58	47	38	104	34	15	19
MAINWORKER FEMALE	3	11	6	9	10	35	5	2	2
MARGWORKER	28	128	239	231	339	389	121	51	226
MARGWORK_M	14	50	81	73	132	132	36	14	89
MARGWORK_F	14	78	158	158	207	257	85	37	137
NONWORKER	176	172	222	135	182	262	74	32	103
NONWORKER MALE	19	84	115	69	93	129	32	17	48
NON WORKER FEMALE	157	88	107	66	89	133	42	15	55

Figure 28: Break up of literacy and employment of Population in Surrounding Villages (Census 2011).



	MANDI	MANDI	MANDI	JOGINDERNAGAR	JOGINDERNAGAR	JOGINDERNAGAR	DHARAMPUR	DHARAMPUR	DHARAMPUR
TOT. HOUSEHOLD	219145	203747	15398	19597	18324	1273	8292	8292	0
POPULATION TOTAL	999777	937140	62637	84470	79135	5335	34777	34777	0
POPULATION MALE	498065	466050	32015	41245	38538	2707	16550	16550	0
POPULATION FEMALE	501712	471090	30622	43225	40597	2628	18227	18227	0
POP SC	293739	280580	13159	20946	19454	1492	8463	8463	0
SC MALE	147250	140605	6645	10397	9659	738	4087	4087	0
SC FEMALE	146489	139975	6514	10549	9795	754	4376	4376	0
POP ST	12787	12359	428	1843	1789	54	23	23	0
MALE ST	6345	6114	231	831	805	26	14	14	0
FEMALE ST	6442	6245	197	1012	984	28	9	9	0

Figure 29: Population break up of District Mandi & Tehsils Jogindernager & Dharampur

1.2 Socio Economy of the Village/Population.

No adverse impact on the socio-economic condition of the area is envisaged.

The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 26 there is moderately high percentage of *unemployed (35.71%)* and *underemployed is quite high (51.41%)* people in the area despite moderately high level of literacy, (73.30% literates, figure 31) of literacy.

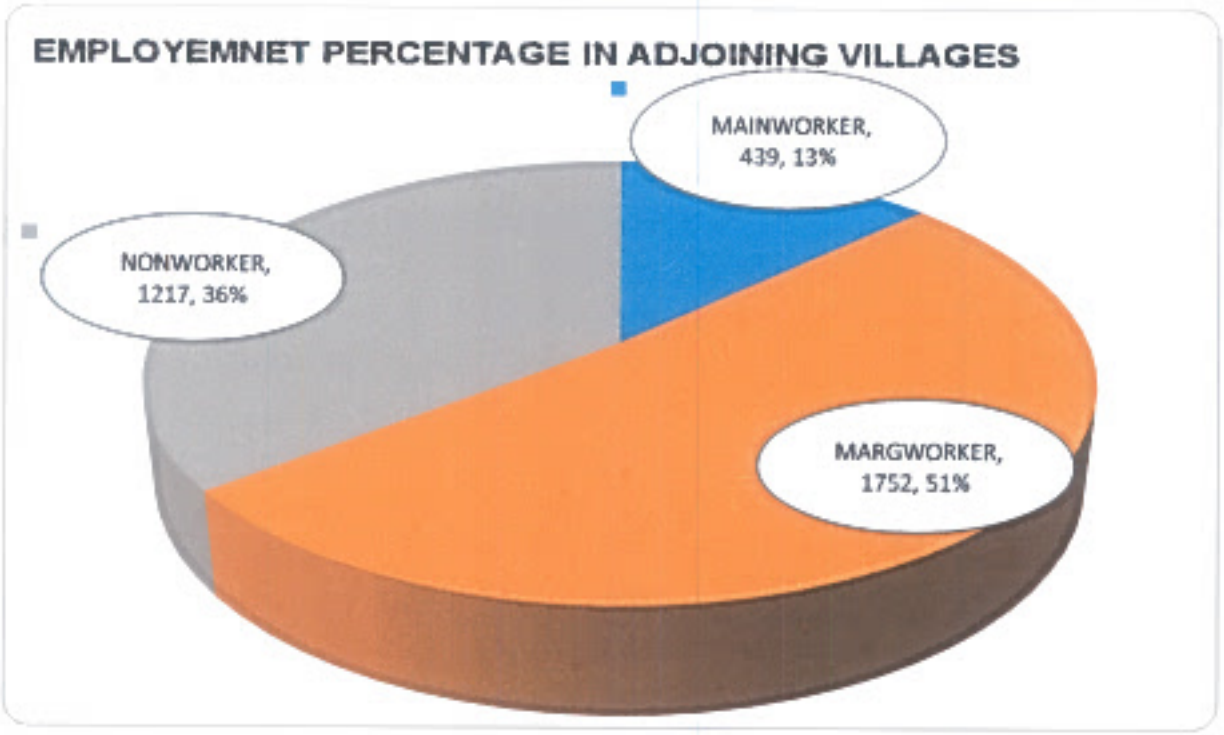


Figure 30: Employment percentage in adjoining villages.

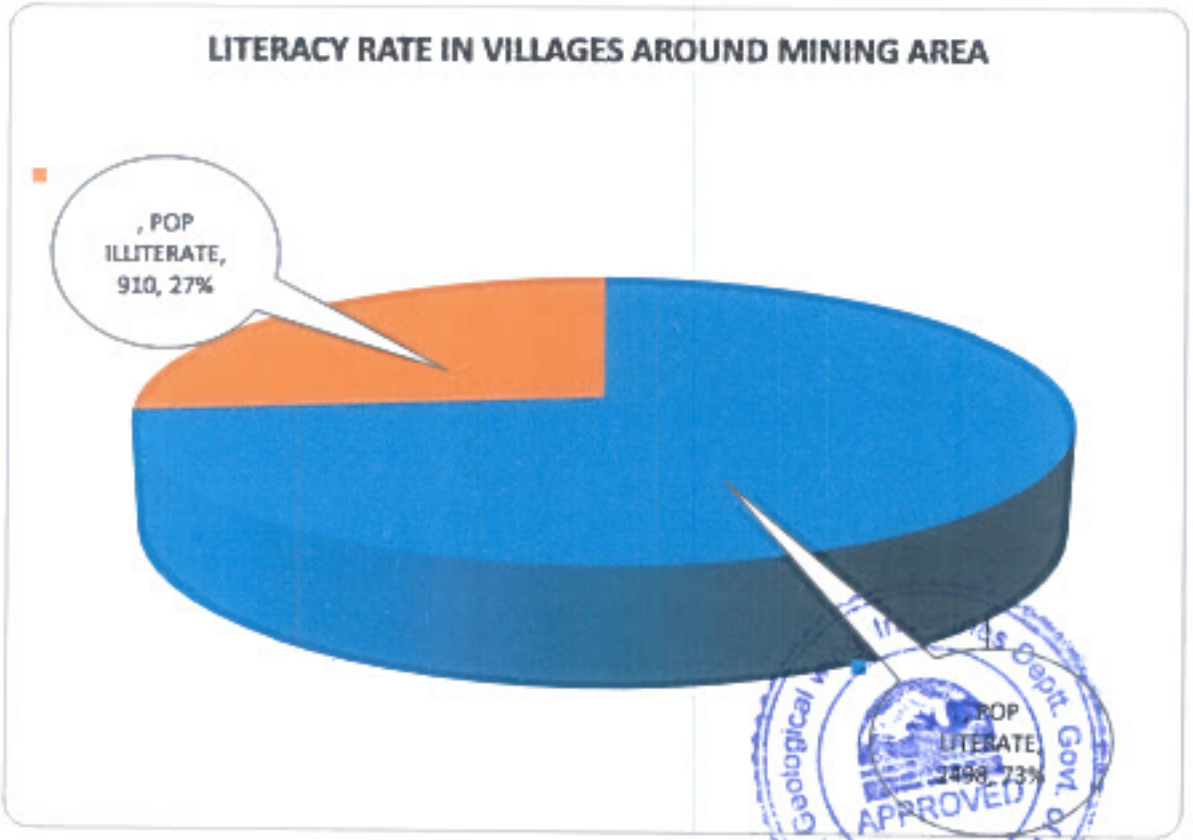


Figure 31: showing Percentage of literate and illiterate POPULATION in the Surrounding mine area

1.3. Land Use Pattern

Primarily the land of the district can be classified in following 7 categories as shown in figure 32.

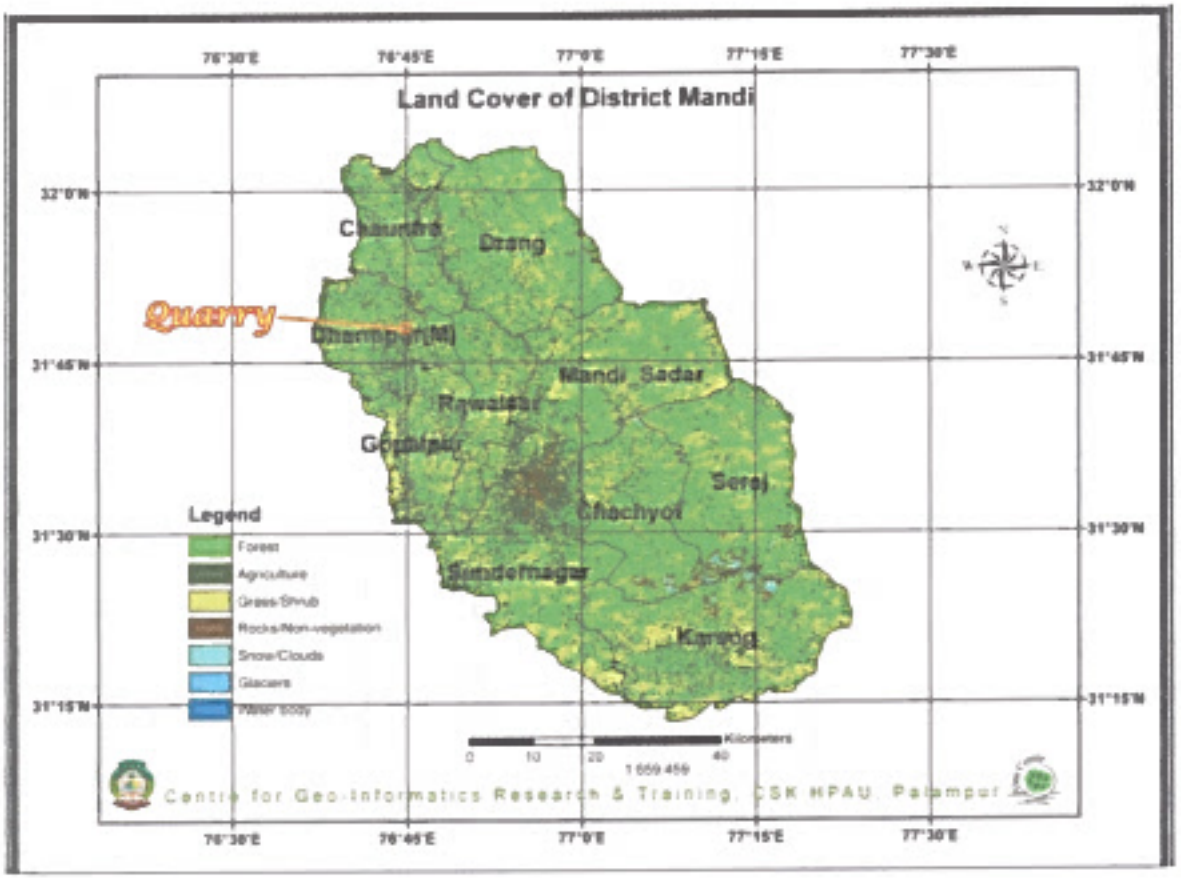
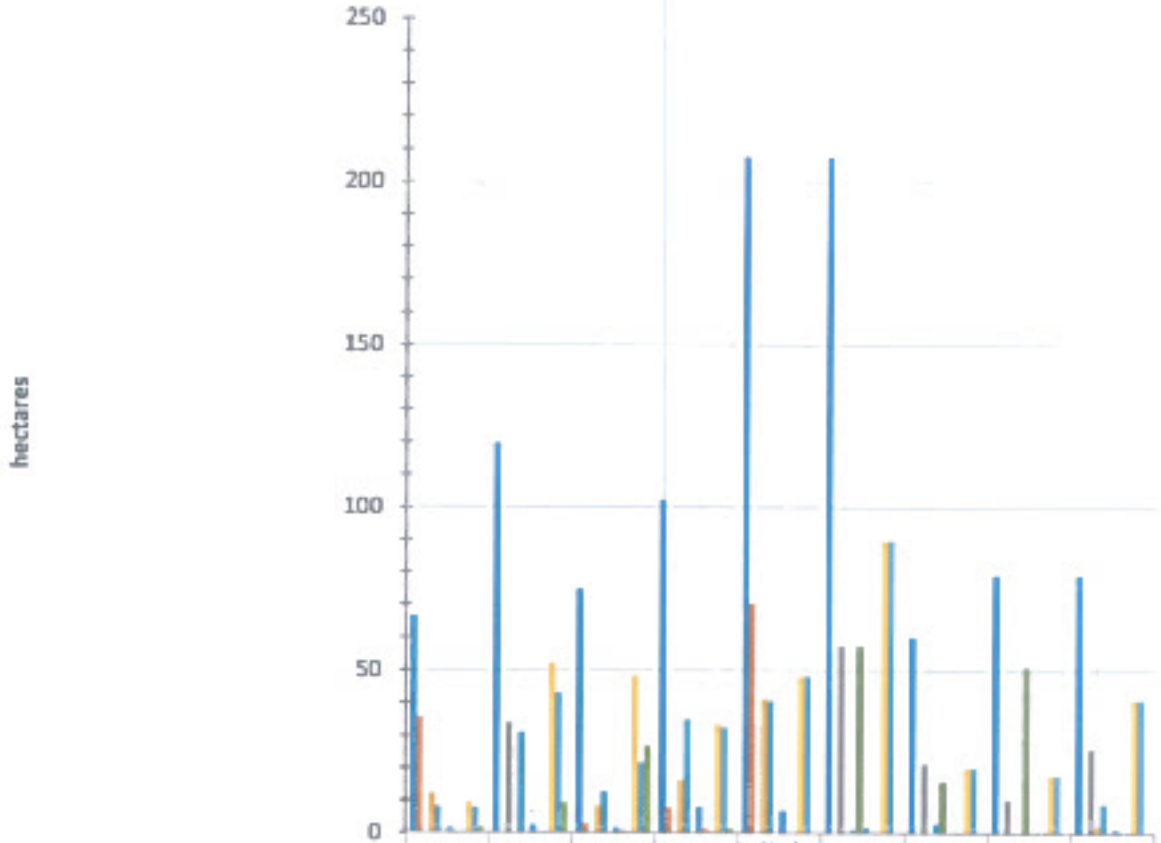


Figure 32: Showing General Land Use Pattern of the District Mandi.

The below figures show the land use pattern of nearby villages and tehsil Joginder Nager and Dharampur respectively.

The District Census 2011 classified the land available in surrounding villages into following nine categories:

1. Land under Miscellaneous tree crops
2. Culturable waste land
3. Fallows Land other than Current Fallows
4. Current Fallows – net area sown
5. Area under non-agricultural uses
6. Barren and Un-cultivable land
7. Barren & Un-cultivable Land.
8. Permanent Pastures and Other Grazing Land
9. Forest



	Gadyara (218)	Parain (223)	Langna (222)	Giuhani (224)	Neri Kotla (226)	Sidhpur (52)	Malva (106)	Narayan Garh (103)	Bahri (108)
	Jogindarnagar					Dharmpur			
Total Geographical Area	66.5	119.55	74.56	102.18	207.55	207.29	59.98	79.19	79
Forest Area	35.65	0	2.96	7.97	70.55	0	0	0	0
Area under Non-Agricultural Uses	0	33.94	0	0	0	57.55	21.42	10.36	26
Barren & Un-cultivable Land Area	11.97	0	8.42	16.28	41.34	0	0	0	2
Permanent Pastures and Other Grazing Land Area	8.07	30.91	12.48	34.84	40.6	1.15	2.97	0	9
Land Under Miscellaneous Tree Crops etc. Area	0	0	0	0	0	57.38	15.68	50.82	0
Culturable Waste Land Area	1.37	2.45	1.54	8.03	6.92	1.59	0	0.39	1
Fallows Land other than Current Fallows Area	0	0	0.7	1.43	0	0	0	0	0
Current Fallows Area	0	0	0	0	0	0	0	0	0
Net Area Sown	9.44	52.25	48.46	33.63	48.14	89.62	19.91	17.62	41
Total Unirrigated Land Area	7.69	42.96	21.76	32.39	48.14	89.62	19.91	17.62	41
Area Irrigated by Source	1.75	9.29	26.7	1.24	0	0	0	0	0

Figure 33: Showing Land Use Pattern of villages around the mining lease area.

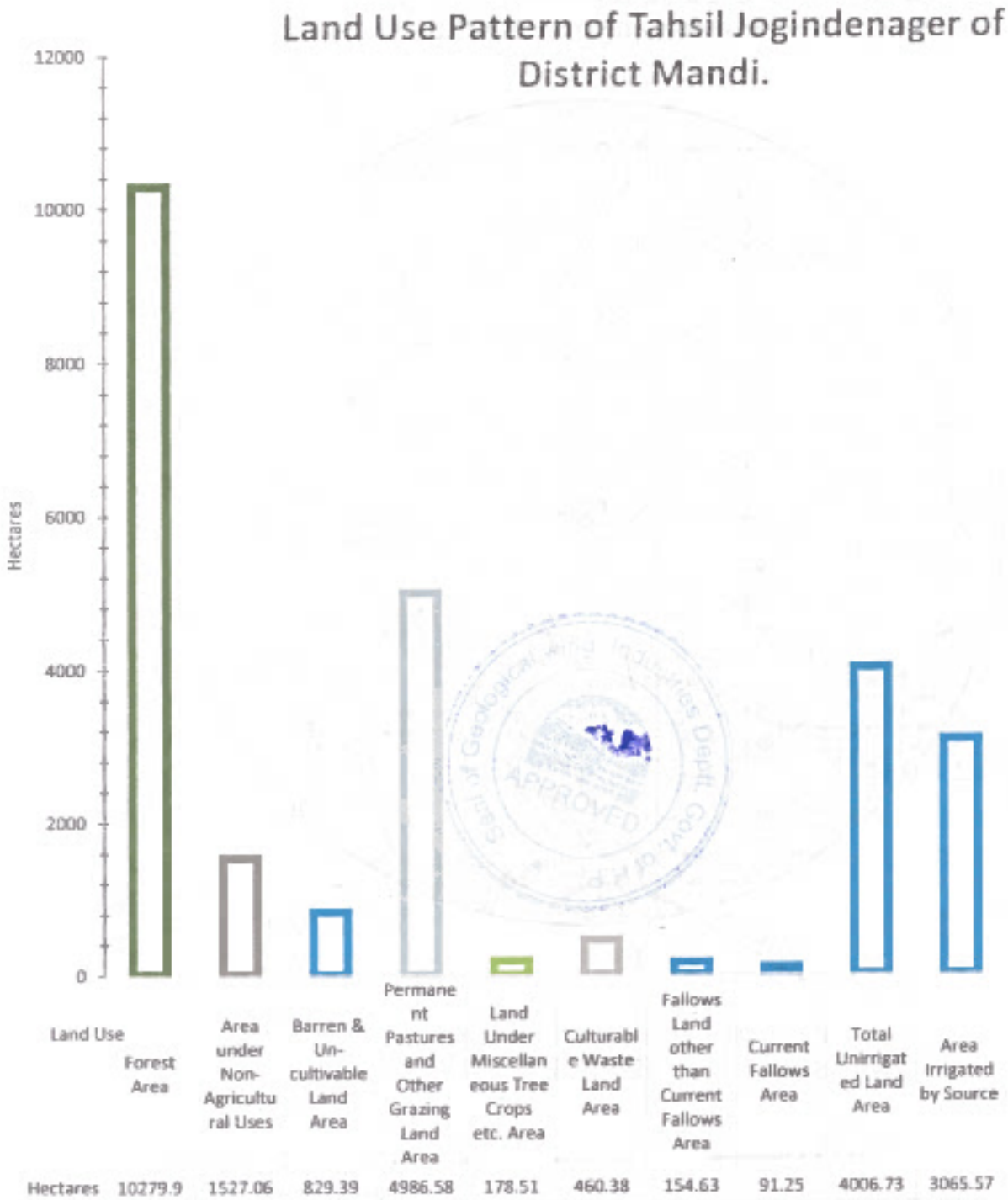


Figure 34: Land Use Pattern of Tahsil Joginder Nager of District Mandi.

Figure 35: Showing the Five kms Radius Buffer zone.

1.4 AGRICULTURE:

The economy of Mandi district is predominately agrarian as around 80 per cent of the total population is dependent on agriculture and activities allied to it for earning their livelihood. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the uneven. The crops usually face moisture

stress during the remaining period of the year due to inadequate and irregular rainfall. The irrigation facilities are provided by lifting water from steams, shallow dug wells and medium to deep tube wells in the valley area.

The source of water and irrigation in district Mandi can be classified into following five classes

- Lift Irrigation Scheme,
- Kuhls,
- Well used for domestic purposes,
- Well used for irrigation,
- Tube wells/

Major food crops are grouped into three categories:

- Cereals,
- Pulses,
- Other food crops like Chilies, ginger, sugarcane and turmeric.
- Non- food crop area is of two kinds:
- Oil seeds,
- Other non-food crops such as cotton, tobacco and fodder crop,

The area under each category of the crop is given below in figure: -36.

Figure: -37 show production of agriculture produces in district Mandi. The area under vegetables and their production is given in the figure: -38.

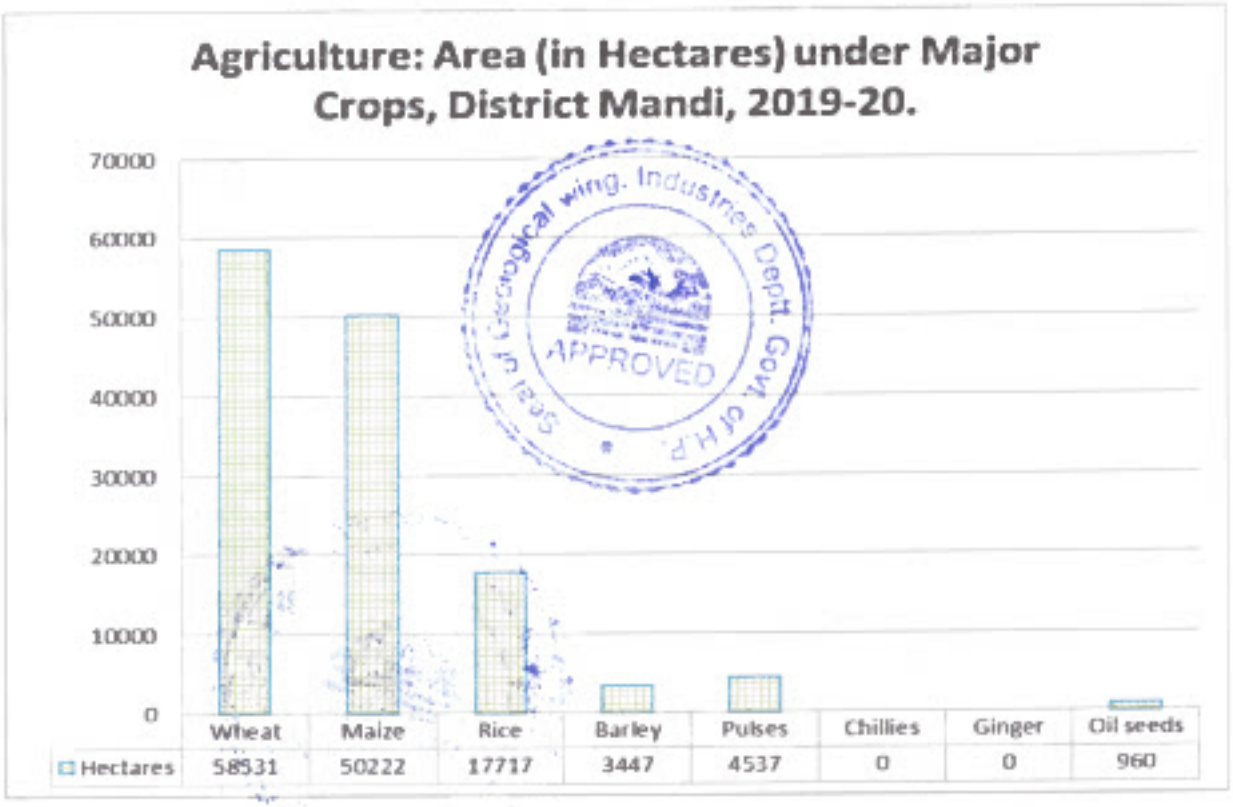


Figure 36: : Showing area under different crops in Mandi District.

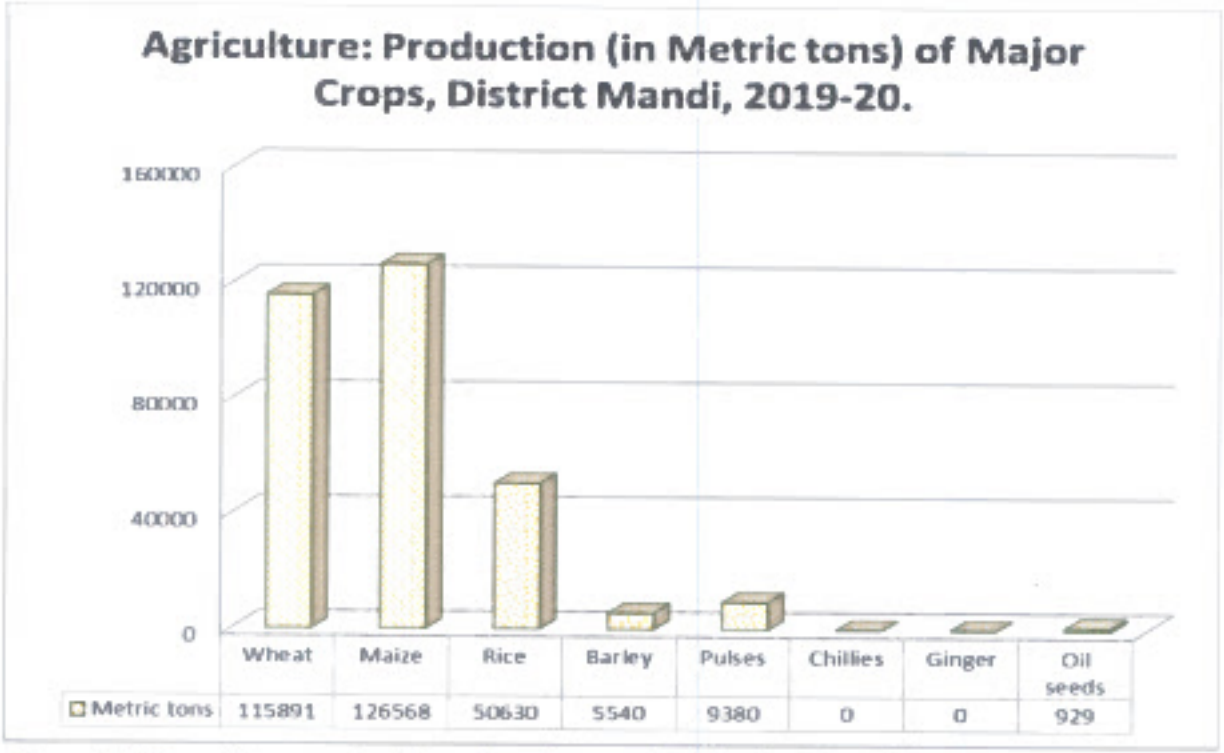


Figure 37 Showing production of each crop in District Mandi.

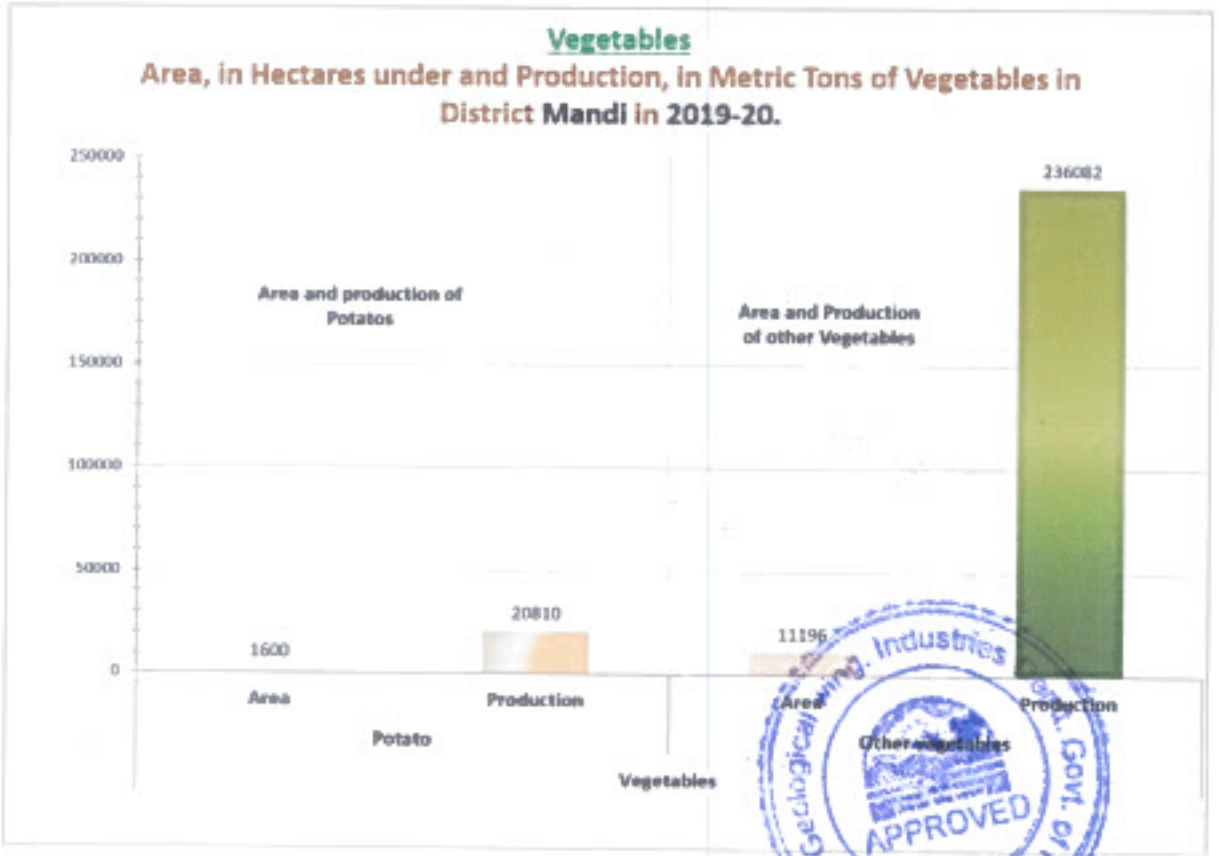


Figure 38: Showing area under vegetable, in Hectare and Production, in Metric tons, of District Mandi.

1.5 HORTICULTURE

The topography and the agro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categories namely high hill areas located at a higher elevation, mid hill areas and low-lying valley areas. Fruits of various kinds depending upon the terrain, climatic condition and soil are grown in the district.

The main horticulture produce of the area can be classified into following five categories.

1. Apple
2. Other temperate fruits
3. Subtropical fruits
4. Nuts and dry fruits
5. Citrus fruits

The area under each fruit as well as the production of each fruit in district Mandi are shown in Table 6.

Table 4; Area under each fruit and their production in District Mandi.

Status of Horticulture
District Mandi.2019-20

Fruit	Area (In Hectares)	Production (In Metric Tons)
Apple	16748	57158
Plum	2856	827
Peach	783	443
Apricot	297	320
Pear	1772	1216
Cherry	24	8
Green Almonds	0	0
Persimmon	252	88
Olive	298	6
Kiwi	29	22

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Strawberry	**2**	**0**
O T F	**6313**	**2930**
Almonds	**1502**	**288**
Walnut	**1055**	**137**
Piccanut	**392**	**22**
Nuts & Dry Fruits	**2949**	**447**
Orange	**730**	**255**
Malta	**196**	**0**
K. Lime	**2999**	**245**
Galgal	**538**	**345**
Others	**3**	**0**
Citrus	**4466**	**845**
Mango	**4964**	**2683**
Litchi	**590**	**701**
Gauva	**693**	**317**
Papaya	**24**	**32**
Loquat	**4**	**0**
Aonala	**154**	**70**
Grapes	**2**	**7**
p-gruate	**473**	**202**
Jackfruit	**215**	**32**
Others	**8**	**15**
O S T F	**7127**	**4059**

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1.6 ANIMAL HUSBANDRY

Economy of the district is predominantly agrarian, but role of Animal Husbandry is equally important as the farmers must keep the cattle for the purpose of ploughing the land and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family. The total population of the livestock in District Mandi is given in the figure: -39. The population of the Buffaloes and Cattle in District Mandi is given in the figure: -40.

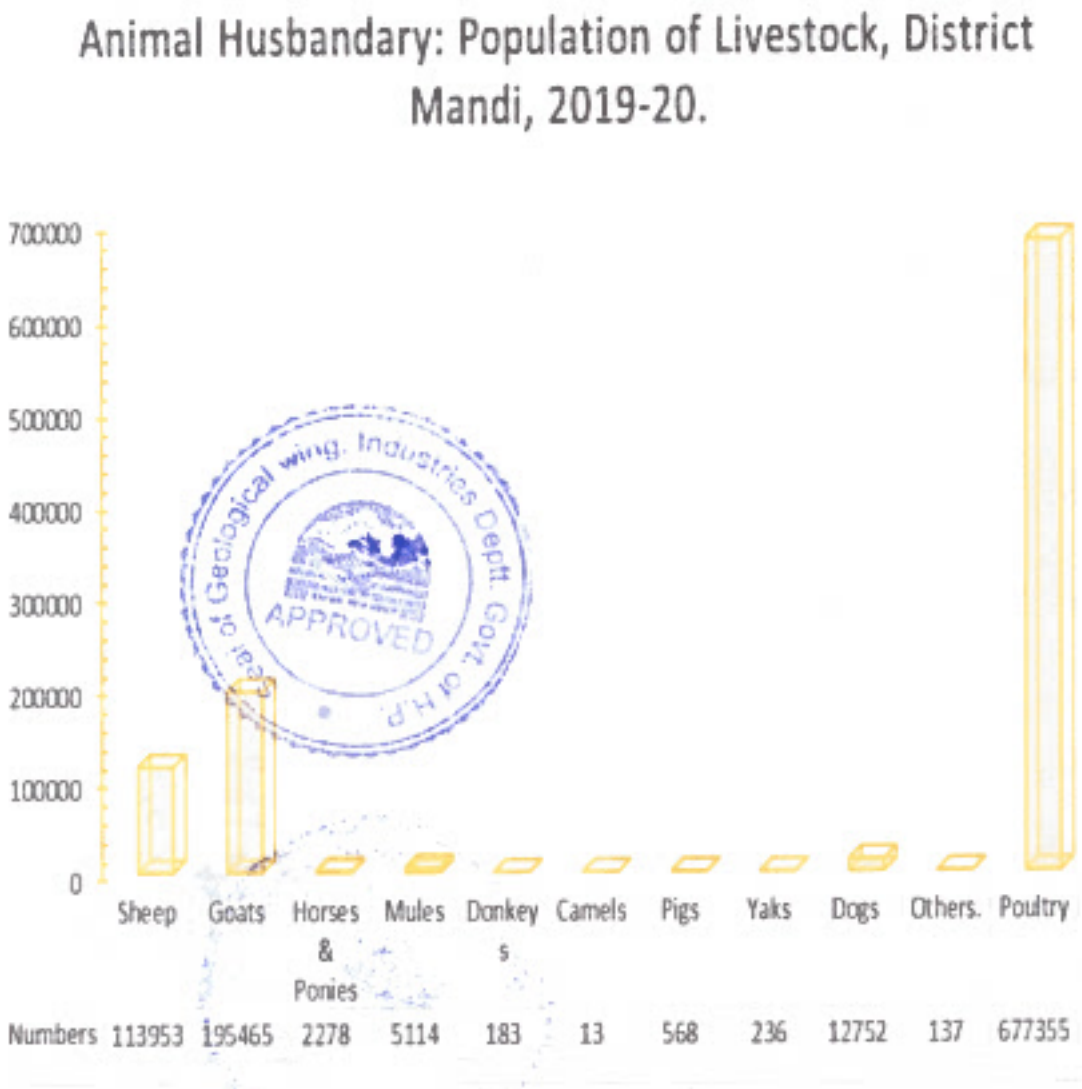

Figure 39:Livestock population of District Mandi.

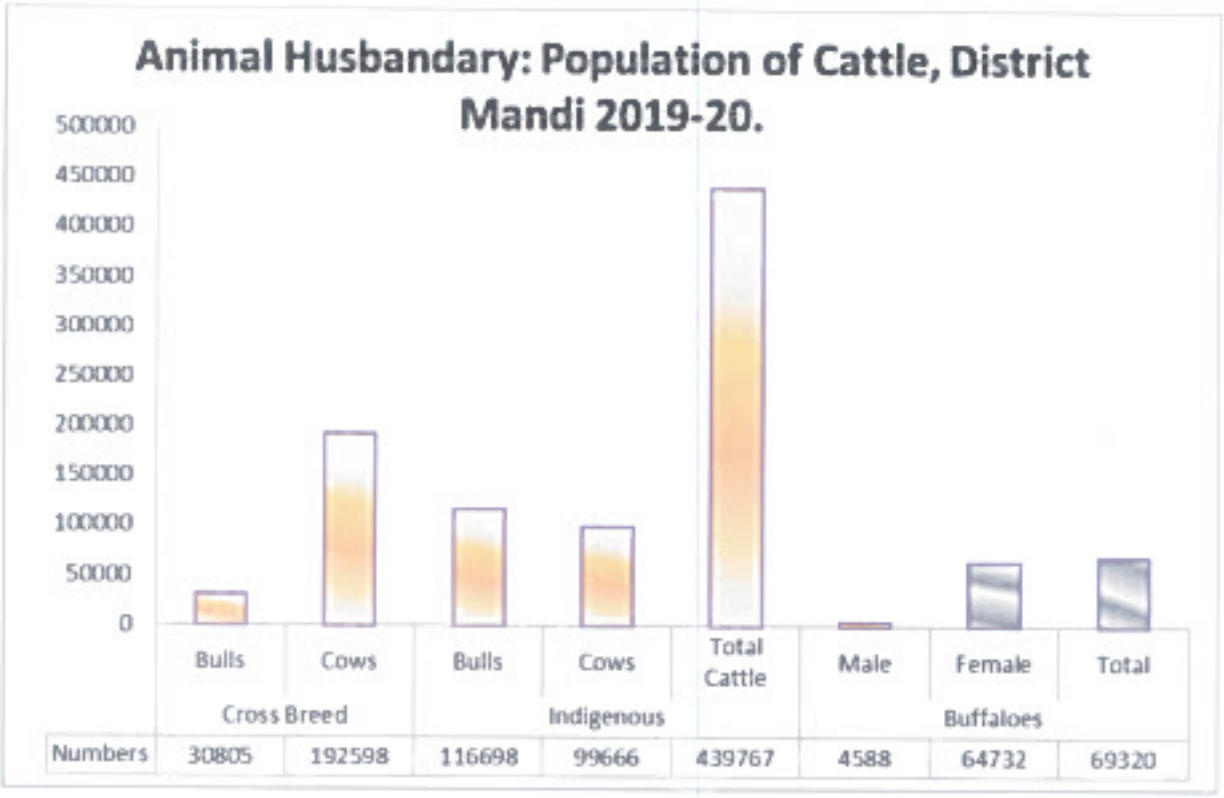

Figure 40: Showing Population of Cattle Buffaloes in District Mandi.

1.7 FISHERIES

There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi district:

Trout

Mahasir

Gid Seviyon

Dise Gugli and

Mirror Carps

The exotic trought fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himalayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trought fishing.

No perennial stream passes through the area under consideration.

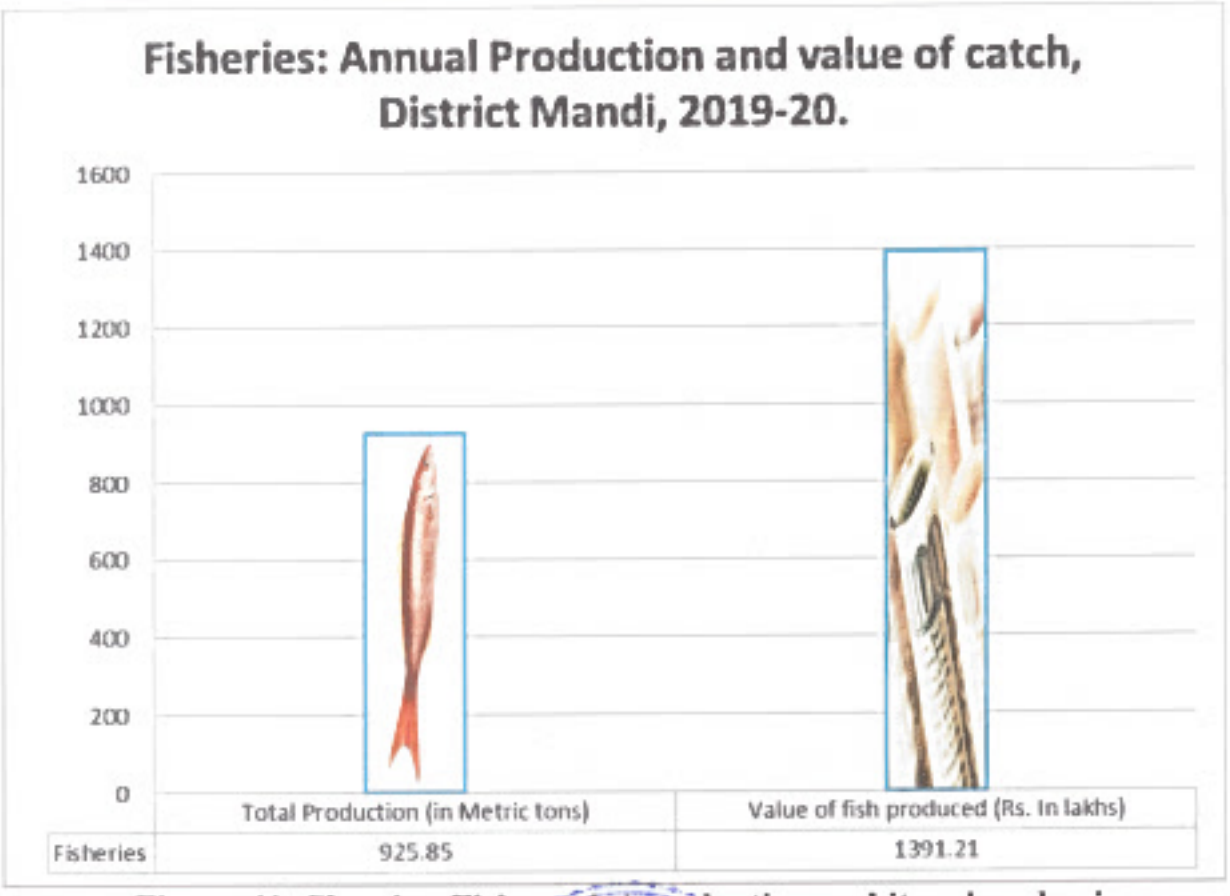

Figure 41: Showing Fish catch / production and its sale value in 2019-20.

1.8 FLORA AND FAUNA

1.8.1 Flora

The Chil is considered the prevailing conifer up to about 1950 meter when it gives place to the Deodar and the blue pines. In Mandi district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is 427 meter above sea level and highest range of is at an elevation of 2658 meters in the north. The forests grown between these two extremes vary as the elevation itself.

The most prominent varieties of trees found in the district are

Simbal (Bombex malabaricum),
Mango (Magniferaindica)
Tun (Cedrela toana)
Several species of acacia and albizia

Salambra (Odina wodier)
Termnalia
Jamun (Engenia jambolana
Larger tour
Bamboo

The common fruit trees are banana, apple, ber, jamun, mango, mulberry, almond, peach etc

Shrubs

The most common shrub at the higher elevation is Barberis, indigopera and Desmodium and following other shrubs are also found

1. Vitex
2. Munj
3. Ber
4. Ipomea
5. Dodonea &
6. Bamboo.

The common fruit trees are banana, apple, ber, jamun, mango, pear, mulberry, apple, almond, cherry, peach etc

1.8.2 Fauna

Animals

Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in the district. Common Mammals & Birds in the Mandi District is given in the Table :-7

Table 7: Common mammals and birds in the Mandi District.

Table 5

Birds		
Zoological Name	**English Name**	**Common Name**
Milvus migrants	Vulture	Cheel, Gidh, Fell
Eudynamys scolopacca	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

Colums livia	Hawk	Baj
Francolius francolinus	Black partridge	Kala Tittar
Francolius pondicerians	Grey partridge	Safed Tittar
Payo crisslatus	Peacock	Mor
Coturnix colurnix	Common quail	Bater
Alectoris graeca	Chakor	Chakor
Crovus splendens	Crow	Kanwa
Prottacula Karneri	Parrot	Totta
Tragopan melanocephalus	Western horned Tragopan	Phulgar/Jujurana
Picoides macei	Fulvourbreasted Pied Woodpecker	Kathfowra
Streptopelia decaocto	Ring dove	Gughi
Streptopelia chinesis	Spotted dove	Gughi
Accipiter badius	Shikra	
Aquila rapax vindhian	Tawny eagle	
Ducula bicolor	Green Pigeon	
Parus rufonuchalis	Tits	
Picus canus	Black napped Woodpecker	Woodpecker
Drycocopus javensis	Woodpecker	
Muscicapa subrubra	Himalayan Fly Catcher	
Acidotheres tristis	Common Myna	Ghatari
Terpsiphone paradisi	Paradise flycatcher	Choti- Pinja
Passer domesticus	House sparrow	
Carduelis spinoides	Himalayan Green Finch	Chiria

Table 6

Mammals in Mandi

Zoological Name	English Name	Common Name
Felis bengalensis	Leapard Cat	Mirag, Bagh
Felis Chane	Jungle Cat	Jangli Billi

Muntucus muntisk	Barking Dear	Kakkar
Vaulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sus sacrofa	Boar	Suar
Hystrix indica	Porcupine	Sehal
Lepus nigricoilis	Hare	Khargosh, Sherru, farru
Moschus moschifarus	Musk deer	Kastura
Capra ibex Ibex	Ibex	
Hemitragus jemlahicus	Himalayan Thar	Thar
Selenarctos thebatanus	Black Bear	
Ursus arctos	Brown Bear	
Panthera unica	Snow leopard	
Sus scrofa	Wild Boar	
Axis axis	Spotted deer	Chital
Cervus unicolor	Samber	
Hylopetes fimbriatus	Flying squirrel	
Panthera pardus	Leopard	Cheetah
Felis chaus	Jungle cat	
Paradoxurus hermaphroditus	Indian Civet	Sakralu
Hipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

In the area surrounding the mining lease following are the common birds: -

- Chakor
- Crow
- Red Jungle Fowl (Jangli Murga)
- Black Partridge (Kala Titar)
- Grey Partridge (Safed Titar)
- Woodpecker

In the leased-out area and surrounding hills following are the common animals: -

- Leopard (Bagher)
- Hare
- Wild Bore (Jangli Soor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- Pig.

1.9 CLIMATE

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 6.

The area enjoys monsoon rainfall from third week of June to mid-September.

The rainfall records available with the District Collectors office from 2004 to 2014 are depicted in the figure 7.

The climatic information given is based on the data obtained from Revenue Department of Himachal Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D.C office Mandi, and at Sundernagar. All information available indicates following seasons in the district:

Winter	**Dec. – March**
Summer/Pre-monsoon	**April- May**
Monsoon	**June- September**
Post Monsoon/ Autumn	**October- November**

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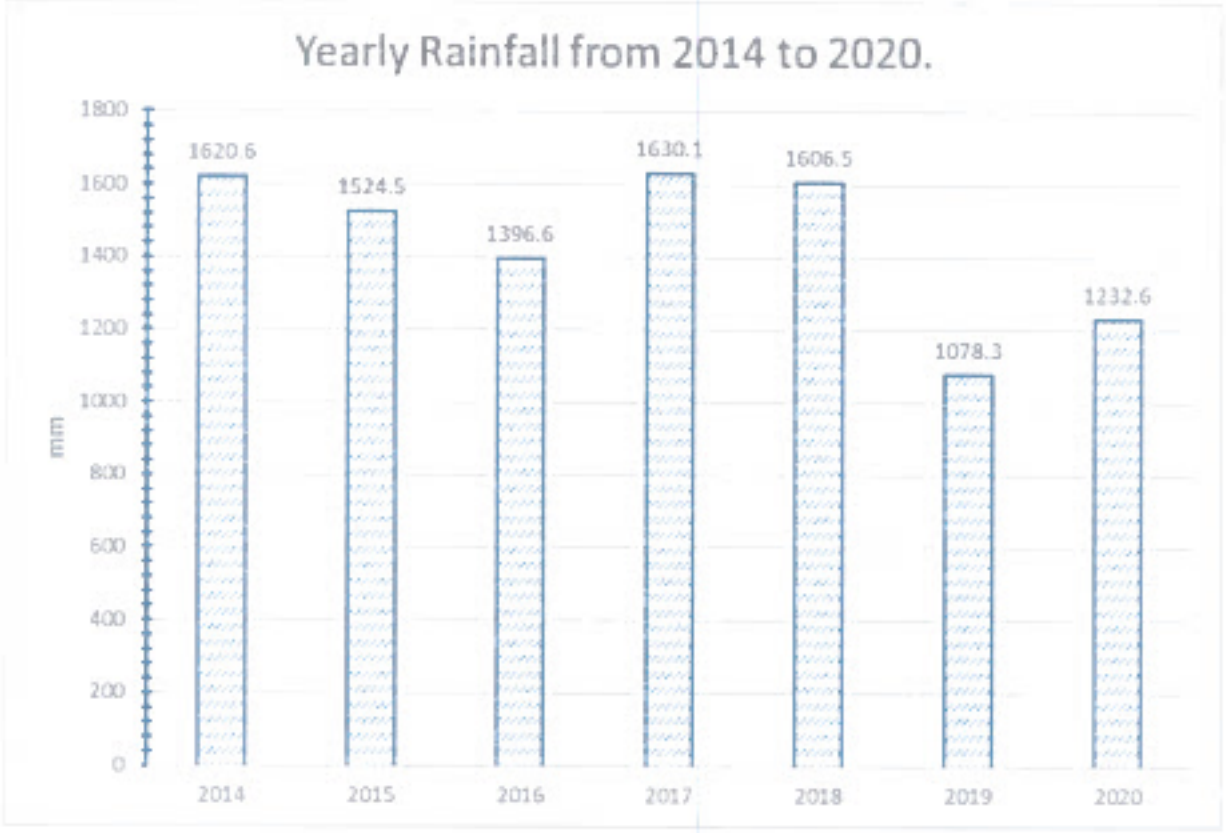

Figure 42:Yearly Rainfall from year 2014 to 2020.

2.0 ENVIRONMENT MANAGEMENT PLAN

The impact on environment due to mining operation is generally: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate
- Air Pollution
- Noise Pollution
- Visual Impact
- Socio- economic Impact
- Accumulation of Scree.

2.1 CHANGE IN TOPOGRAPHY.

✓ No affect.

- The area is riverbed and mined out pit will be filled during rainy season hence there would be no change. It is part of a Riverbed.
- The highest point of the Lease area is at 609 metre above mean sea level.
- The lowest point is at 605 m above MSL.
- Mine Area is proposed in the entire safe area.
- The block would be completely replenished during monsoons floods.
- The mining shall be confined to well within the riverbed corridor.
- Mining shall be undertaken to a depth of one metre or water level whichever is less.
- The Lease area is and shall remain riverbed.
- Thus, the topography or landform of the Riverbed *per se* will not be changed.
- The land use of the mining Lease area is defined in the Revenue record as 'Gair Mumkin Darya'.
- The land under active mining would always remain riverbed, during as well as post mining.

2.2 Effect on Climate

- The mining Lease area is small.
- Mining will be confined to 32500 square metres safe area.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed.
- The mining will be confined from within the riverbanks.
- Some micro level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed
- The impact will need no mitigating measures.

2.3 Impact on Air

- No blasting material is to be used.

- The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).
- The mining activity will be limited to excavation of about 180 metric tons of stone, Bajri and sand with silt-clay per day.
- 30 tipper truck trips will be able to move the required material from mine to crusher / Project sites.
- This activity would generate very limited disturbance to air quality.

2.4 Impact on Noise Level and Mitigation Measures

- The mining area represents calm surroundings.
- The mining shall be manual causing hardly any noise.
- The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.
- About 30 trucks trips would be required for transporting mined material per working day from mining area to destination.
- The dedicated tipper truck would be properly and regularly undergoing maintenance to create minimum noise.
- Care would be taken to properly maintain the silencers of the vehicles.
- No use of horn shall be allowed in or near the mining area.
- A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of River to screen the noise, if permitted by the private land holders.

2.5 Effect on Flora & Fauna

- The mining Lease area is riverbed.
- There is hardly any flora or fauna on the riverbed to attract any protective or mitigating measures

2.6 Soil Cover

- The mining will be confine to Riverbed.
- It has no soil cover as the area gets frequently flooded during monsoons.
- Thus, there shall be no impact on any natural soil cover.

2.7 Impact on Hydrology

- The mining area is part of riverbed.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed
- The mining will be confine to central part of riverbed, away from banks.
- Thus, mining would be dredging the riverbed and reducing the silt burden downstream.

- The ground water (undercurrent of the river) will not be disturbed as mining will be undertaken above Water table.

2.8 Waste disposal Management

The area is in a regular course of the river and silt clay is the only waste likely to be produced. The waste generated if any will be used as backfill where separable.

2.9 Socio- Economic Impact

- No adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 30 persons directly and indirectly, in mining, transportation, and crushing unit.

2.10 Transport of Mineral

From Quarry to Road heads towards Rural Road is about 100m through the river track. The mined material is transported through tracks made in the river. About 270 metric tonnes of material shall be transported per day with an average of 30 tipper truck trips. The movement of 30 tipper truck tips would have hardly any impact on traffic on Rural Road leading to SH 19 and would cause negligible environmental impact.

PART III

1.Progressive Mine Closure Plan/Reclamation Plan

1.1 Reclamation

- The mined area being part of the river course cannot be reclaimed for any other purpose.
- The land under active mining would always remain riverbed, during as well as post mining.
- The highest point of the Lease area is at 609 metre above mean sea level.
- The lowest point is at 605 m above MSL.
- The mining shall be confined to well within the riverbed corridor.
- No mining near the banks up to 1/10th of its width is to be undertaken as per guidelines, i.e., 20 to 23 metres, from banks.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed.
- The entire quarried area will be replenished and reclaimed by the river during monsoon floods.
- The Lease area is and shall remain riverbed.
- Thus, the topography or land use of the Riverbed *per se* will not be changed.
- As such no reclamation work of mined area is required to be undertaken.

1.2 Mine Waste Disposal:

a) Year wise generation of mine waste and soil cover.

As explained earlier the following category of the waste is generated during riverbed mining.

- Silt/ Clay Mixture

The silt and clay are generally being inseparable from sand and extracted along with it.

As such no waste will be generated during the mining of stone, sand and bajri.

1.3 The arrangements made for topsoil utilization, if any

As the mining area is part of riverbed, having no topsoil cover therefore, no topsoil is required to be removed, or disposed of.

1.4. Preventive Check dams

Considering the rocky condition of riverbanks, no check walls are required to be constructed.

1.5 Plantation work

As far as the order of Apex court in writ petition(s)No(s) 114/2014 titled as Common Cause Vs Union of India & others is concerned, the riverbed which suffer frequent foods during monsoon period and where no grass growth is possible, as such mining area cannot be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance
First	100	15	5000
Second	0	0	2000
Third	0	0	2000
Fourth	0	0	2000
Fifth	0	0	2000
Total	100	15	13000

Year wise survival rate.

The survival rate is about 30 percent in the area because of the sandy nature of the site. However, after yearly review it will be ensuring that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured to be at least 100 percent.

2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is no point of utility within radius of 100 metres of the mining lease periphery, which may need any kind of protection.

3 MANPOWER DEVELOPMENT

The mining activity will be mainly manual. Worker are mainly required in riverbed mining for extraction and loading of riverbed material into tipper truck and tractor trolleys. Drivers for tippers and tractors will be another category of workers. Thus, employment potential is as given below:

Munshi	1
Drivers	3
Unskilled workers	17

Thus, total generation of Employment will be to a tune of 21 both skilled and unskilled workers.

4 USES OF MINERAL

The stone, sand and Bajri will be consumed in the dedicated crushing unit of the Project and product grit and sand will be used in construction activities of the project.

5 DISASTER MANAGEMENT & RISK ASSESSMENT:

The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:

- Inundation / Flooding
- Drowning
- Accident during mineral loading, transporting, and dumping
- Accident due to vehicular movement
- Earthquakes

Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

Accident during mineral loading, transporting and dumping

The consequences of this scenario are minor which may be taken care with first aid care.

Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

Earthquakes

The area falls in seismic zone IV. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.

6. RECOMMENDATION FOR RISK REDUCTION

Measures to prevent Inundation/Flooding/drowning.

- Being on riverbed there should not be any mining operation during monsoon or rainy day.
- Formation of deep pits should not be allowed.
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders.
- Operations during daylight only.

Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted.
- To avoid danger of accident roads and ramp near embankment should be properly maintained.
- The truck would be covered and maintained to prevent any spillage.
- The maximum permissible speed limit should be ensured.
- The truck drivers with proper driving license would only be employed.

Measures to Prevent Accidents during Earthquakes

- Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes etc will be undertaken in consultation with experts.

Declaration

This is to declare that the Mining Plan of Minor Mineral lease of part of Son Khad, for Stone, bajri and sand situated in Khasra No. 2721/1, measuring 4.1207 Hectares, Mauza/Mohal Prain Tehsil Jogindernager & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs..... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

Date
Place KOTLI

The General Manager
Triveni Mahadev & Thana Plaun HEP's,
Himachal Pradesh Power Corp.Ltd.,
Tehsil Kotli, Distt. Mandi.

Certificate

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra No. 2721/1, measuring 4.1207 Hectares, Mauza - Prain, Tehsil Jogindernager & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

- The information provided and data furnished in this 'Mining Plan' is correct to the best of my knowledge.

Date
Place: Shimla

Seal of Geological wing, Industries Dept. Govt. of H.P. APPROVED

Jhumpa C. Jamwal
Cottage No. 21, Type IV,
HP Government Officers Residences,
CPWD Colony, Bemloe, Himachal Pradesh
RQP Registration No. HP/RQP/21/1/2016

Plate 4

Land Cover & Land use Map of Buffer Zone Five Kilometres Radius

Geological wing, Industries Deptt. Govt. of H.P.
APPROVED
N
W
E
S

Part of Survey of India Toposheet Nos H43E9 & H43E13

Lessee **The General Manager** **Triveni Mahadev & Thana Plaun HEP's,** **Himachal Pradesh Power Corp.Ltd.,** **Tehsil Kotli, Distt. Mandi.**	*Jhumpa C. Jamwal* *HP/RQP/21/1/2016*

Plate 1

Lessee
The General Manager
Triveni Mahadev & Thana Plaun HEP's,
Himachal Pradesh Power Corp.Ltd.,
Tehsil Kotli, Distt. Mandi.

Jhumpa C. Jamwal
HO/RQP/21/1/2016

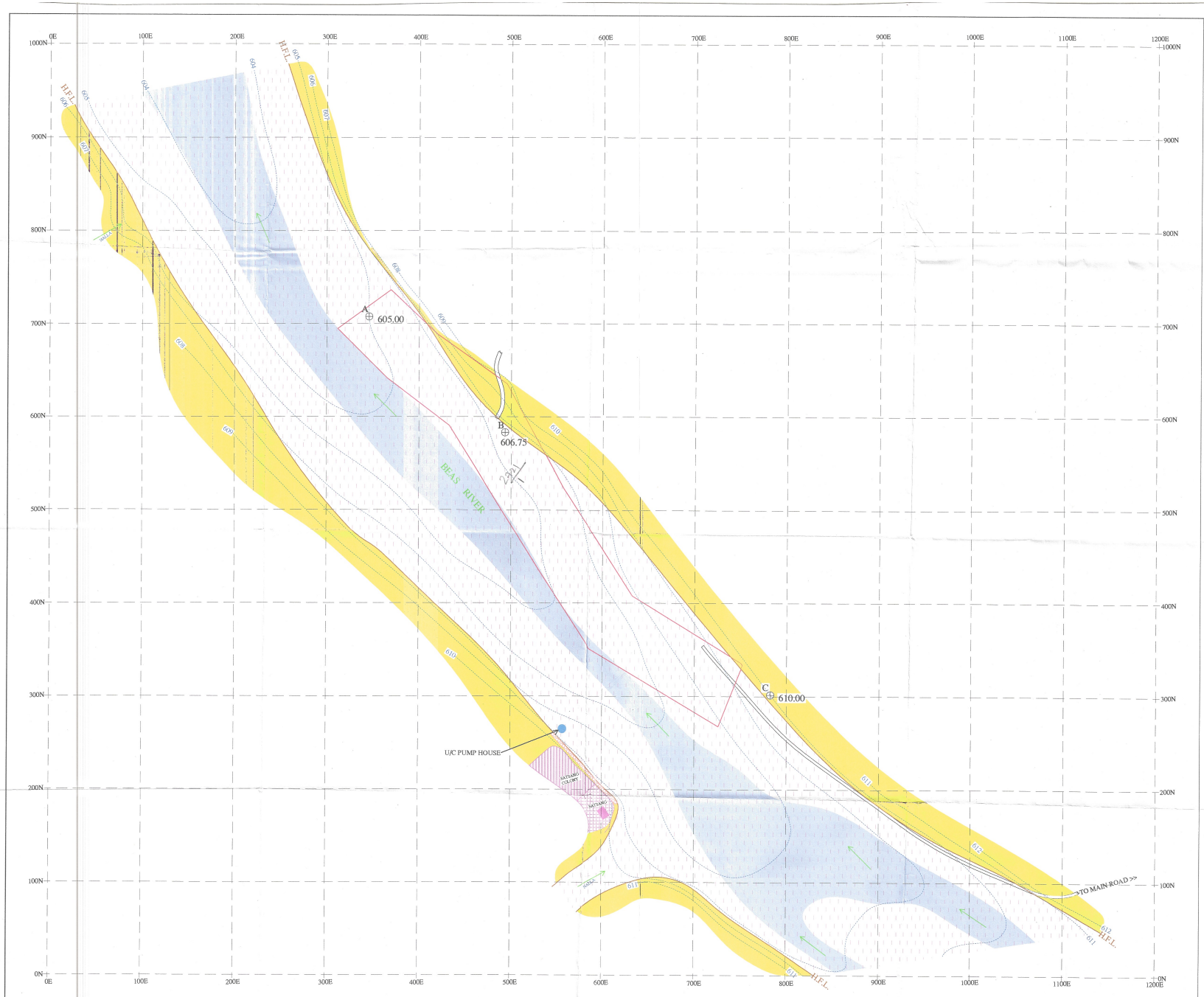

Plate No. 2

GEOLOGICAL INDEX

- CHANNEL DEPOSIT
- TERRACE DEPOSIT

TOPOGRAPHICAL INDEX

- LEASE BOUNDARY
- 605.00 SURVEY STATION
- 605 / 606 CONTOUR LINE
- H.F.L. HIGHEST FLOOD LEVEL
- RIVER FLOW
- HAUL ROAD
- CREATE WALL
- U/C PUMP HOUSE

M/S TM & TP HEP'S, HPPCL.(BEAS RIVER (PRAIN Q-5.)

APPLIED BY	THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEP'S, HPPCL.
SCALE	1:2000 (1 CM = 20 METERS)
CONTOUR INTERVAL	1.00 METER.

GEOLOGICAL AND SURFACE PLAN FEATURES.

COORDINATES : -

A N-31°50'10.67"
E-76°45'19.40"

B N-31°50'07.01"
E-76°45'24.90"

NORTH: -

CERTIFIED THAT THE PLAN IS CORRECT.

JHUMPA C. JAMWAL
No. HP/RQP/21/1/2016

State Geological wing, Industries Room, Govt. of H.P. APPROVED

Plate No.II

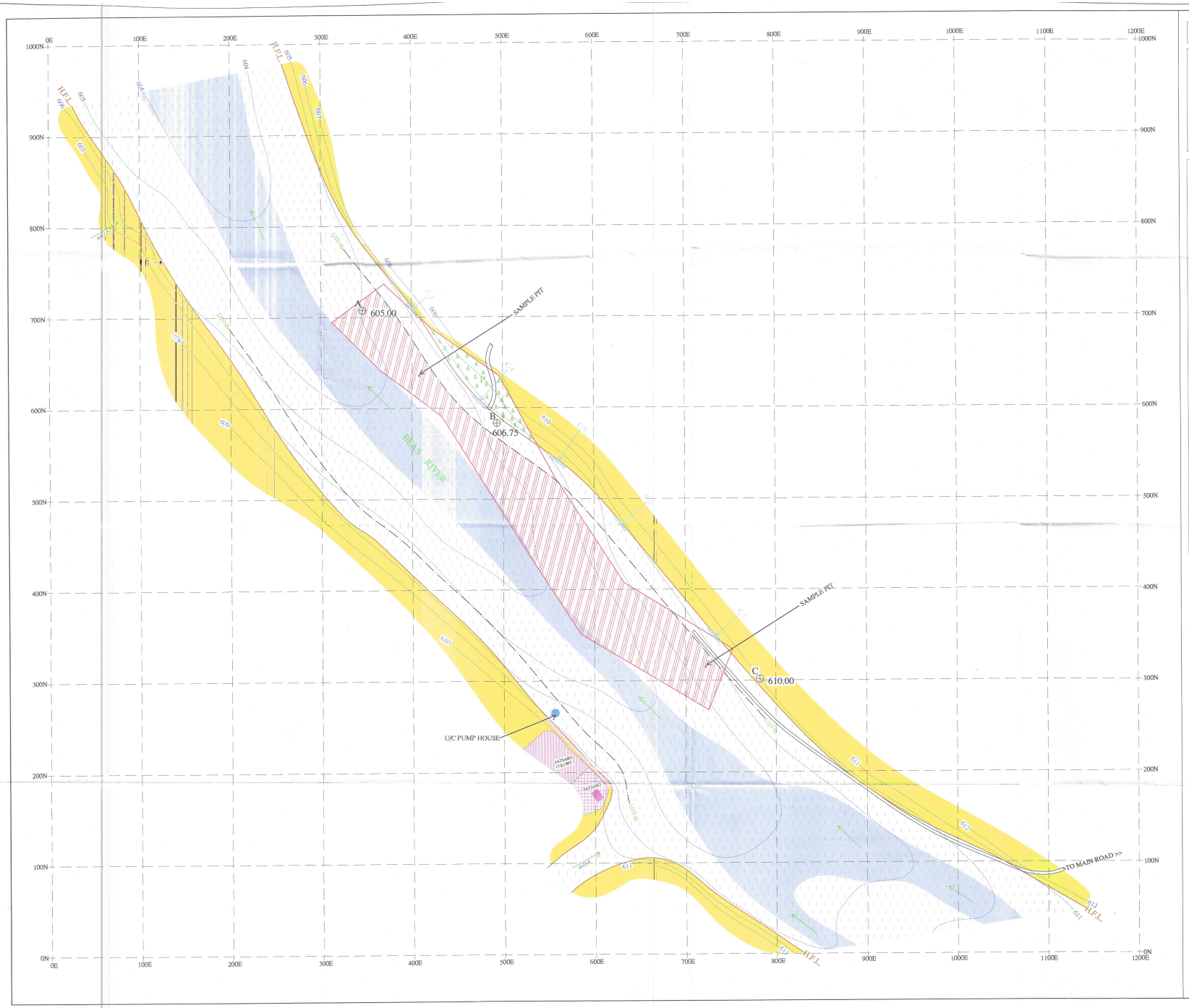

Plate No. 3

GEOLOGICAL INDEX

- CHANNEL DEPOSIT
- TERRACE DEPOSIT

TOPOGRAPHICAL INDEX

- LEASE BOUNDARY
- 605.00 SURVEY STATION
- 605 / 606 CONTOUR LINE
- H.F.L. HIGHEST FLOOD LEVEL
- RIVER FLOW
- HAUL ROAD
- CREATE WALL
- U/C PUMP HOUSE
- 1/10th PROHIBITED ZONE
- PURPOSED CHECK DAM
- P PLANTATION
- WORKING AREA
- SAMPLE PIT

M/S TM & TP HEP'S, HPPCL.(BEAS RIVER (PRAIN Q-5.)	
APPLIED BY	THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEP'S, HPPCL.
SCALE	1:2000 (1 CM = 20 METERS)
CONTOUR INTERVAL	1.00 METER.

GEOLOGICAL PLAN SHOWING PIT POSITION AT THE 1ST TO 5TH YEAR.

COORDINATES : -

A N-31°50'10.67"
E-76°45'19.40"

B N-31°50'07.01"
E-76°45'24.90"

NORTH: -

CERTIFIED THAT THE PLAN IS CORRECT.

JHUMPA C. JAMWAL
No. HP/RQP/21/1/2016

Geological wing, Industries Deptt. Govt. of H.P. APPROVED

Plate No.III